JAN 20 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 27, 1898. CHICAGO, ILL. NUMBER 4

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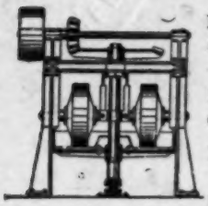

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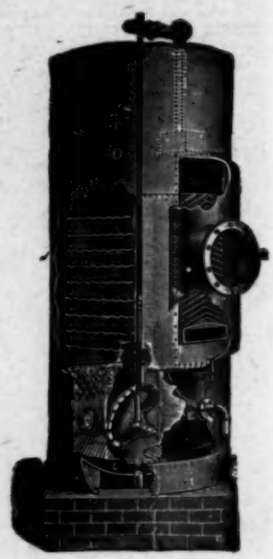

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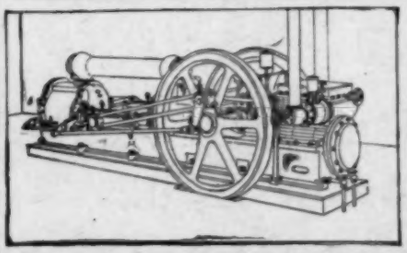

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JANUARY 27, 1898. CHICAGO, ILL. NUMBER 4

THE WEEK IN IRON CIRCLES.

The closing week of January maintains the record of the earlier portion of the month in giving contradictory indications as to the course of the iron trade in later months of the year. It has been a month of larger buying, probably, than any January in the history of the trade has shown. Yet in most lines less business has been taken than in December, which was a remarkable month both for new orders and steady operation of plants. Those who expected some improvement upon December prices to develop thus early in the year have been disappointed. Pig iron, in particular, and in the East and middle territory to a greater extent than in the West—has shown weakness that does not encourage confidence in predictions of possible shortage, with marked advances in spring and summer. Concerning the most recent concessions in Southern iron it is announced, as at intervals for several months, that sellers are now through making them. Indeed stock statistics and the well sold condition of prominent producers reinforce this, but it is recalled that the drop in Southern grades in early December accompanied similar conditions. In the past week gray forge has sold at $6.40 Birmingham. Charcoal iron has been unusually active in the past two weeks, the change in the selling status of Lake Superior producers being followed by low prices that evidently proved attractive to buyers. Bessemer iron is the weakest feature of Pittsburg and valley markets, and neither higher coke nor the higher ore of the coming season—the two increments probably representing 65 to 75 cents on a ton of iron—is provided for in the recent sales for second quarter delivery. The market remains at $9.40 to $9.50, valley, for first quarter, with neither buyers nor sellers pressing second quarter business. Offers of present prices have been refused on April-June delivery. Billet mills are so well sold for the first quarter of the year and many for the first half that the price is well maintained at $15 to $15.25, Pittsburg, for first quarter. Railroad equipment is still the strong factor in demand. Car work has given bar mills business that has kept them turning through weeks ordinarily marked by shutdowns; and the consumption of material in puddling and busheling is now strongly felt in the old material market. After a long drag, holders of scrap find prices again remunerative. Special activity is also noted in cast scrap, which has broken company with foundry iron, advancing while the latter stands still. Shipyard work has contributed a fair share of the orders now in mills. Structural material is not yet as active as some estimates late in 1897 gave indication, but pool prices prevail. The proposd merging of tin plate interests has had no stimulating effect on the market. Prices are even a trifle weaker, and buyers show no concern about getting orders in early. In the wire consolidation progress has been made. Both appraisers and accountants are practically through with their work at the various plants, and the results are now being gone over at New York. Another meeting will be held in the near future.

CLEVELAND.

Office of *The Iron Trade Review*,
27 Vincent St., Jan. 26.

The iron ore problem of 1898 is being worked upon by the governing committee of the Bessemer Ore Association and the amount of detail involved would indicate that some time will be required to perfect a report to the general association. Some recent developments have made the situation a little less promising for an agreement that will include the properties on the Mesabi. Among the majority of new range companies the sentiment is favorable, but the railroad factor is still a dominating one, while another consideration is the fact that less than 40 per cent of the Mesabi production is sold on the market, the producing-consuming interest, to which the greater part of the tonnage belongs, being patrons of the two companies which control the transportation facilities. Thus the maintenance of a good freight rate and the maximum tonnage at that rate is a prime consideration from the standpoint of certain interests.

PIG IRON.—There is quietness in the Bessemer pig iron market. Furnaces have their output quite generally sold for the first quarter of the year, and buyers' offers for the second quarter are not likely to precipitate transactions. Sales for the second quarter are largely by interests having their own coke and ore supplies, and at $9.50, it is represented that only one good profit on the combination of ore, coke and iron can well be figured out. Independent producers, who buy their coke and their ore find $9.50 a less attractive offer—with coke at to-day's figure and ore at, say, a 20-cent advance—than the $9 touched at the low point last year. If the price does not advance it is probable that a restriction of output will be the next move. Foundry iron remains as at last report—$9.25 at valley furnace being a common quotation for No. 2. For local gray forge, $8 75, valley mill, is paid, while Southern iron is 65 to 75 cents higher. Charcoal iron has been unusually active, but the effort of some Lake Superior producers to market accumulations has led to low prices. We quote, Cleveland delivery:

Bessemer	10 15	Valley Scotch No. 1	$10 50@10 65
No. 1 Strong Foundry	10 25@10 50	Valley Scotch No. 2	10 00@10 15
No. 2 Strong Foundry	9 90@10 ·5	Gray Forge	9 25
No. 3 Foundry	9 40@ 9 50	Lake Superior Charcoal	11 50

BILLETS AND RODS.—The local billet market is quoted firm at $15.25, but local and nearby mills are quite well sold ahead, and meantime are not anxious to take business beyond July. An inquiry for 4,500 tons of tin plate bars is reported, delivery in the second half of the year, but mills are not quoting so far ahead. The rod market continues firm, a Pittsburg interest having the bulk of available rods for first half of the year, some of this tonnage being on conversion deals. The quotation is $23.50, a figure that allows practically no profit on plain wire to mills buying their rods. The present Cleveland quotation on wire is $1.15. Wire nails are still quoted $1.40 Cleveland, but jobbers with considerable stocks bought on a lower market are making concessions in view of the somewhat slackened demand.

FINISHED MATERIAL.—The material for a new steel freighter to be built by the Globe Iron Works Co. has been awarded, the plates, about 2,000 tons, going to the Cleveland bidder at a shade under the equivalent of 1c Pittsburg. The shapes, 700 tons, go to Pittsburg. About 150 tons of plates for a steel boat to be built at Toledo for the Yukon have been placed also. On some Ohio business Chicago and Pittsburg plate mills are more sharply competing. An agricultural works is asking bids on 500 tons of plates, bars and machinery steel. Iron and steel bars show no special activity in this market, and prices are unchanged at .95c to 1c valley mill.

The large output from iron mills is evidenced in a firmer market for old material. Cast scrap, also, is in larger demand, even under the low prices prevailing for foundry iron. Recent Cleveland sales of old material are on the basis of $14 for old iron rails, $12 for No. 1 railroad wrought scrap, $11.50 for car wheels, and 10.50 for old steel rails.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Jan. 26.

The market is stronger, and while there have been no actual advances in quotations, except in some grades of old material, there is much more of a disposition on the part of mills and furnaces to hold to the quoted prices, and not make concessions. Sales have been larger than were those of the week before, and included several contracts for large lots. Buyers are showing a desire to close for their needs for the next few months, and do not find the dealers so willing to contract ahead as they were several weeks ago. Reports from mills and furnaces indicte that a very considerable tonnage has been closed within the last two weeks, leaving the producers more independent than they have been. A feature of the market is the shortage in scrap of nearly all kinds, cast scrap in particular.

PIG IRON.—The furnaces are feeling stronger than in the past two weeks, and are not at all disposed to make concessions to secure business. Some of them have refused orders in the week at prices only a little under those we quote. The shortage in scrap has strengthened the market considerably, and is likely to add to the strength in the future. There is a good demand for iron of all grades, and sales last week, particularly those of Northern irons, showed quite a little increase. The largest interest locally reports sales of its output every week, with an excellent demand ahead, and the probability that the inquiries in hand will develop into orders at no distant date. There has been some talk of an advance in prices by the Southern interests, and it is considered likely that this will materialize within a short time. The furnaces in the South have made good sales in the last two weeks, and have only very small stocks on hand. As yet the Northern furnace interests have not talked of higher prices, but all note improved conditions. Consumers are taking their iron as fast as called for in contracts, and in some cases have asked the furnaces to advance shipments. Quite a little activity in charcoal irons resulted from the dissolution of the pool, and consequent lower prices made. Among the sales made was one of 2,000 tons, which was at something less than $12.00, Chicago. We quote:

Lake Sup. Charcoal	$12 00@12 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—The demand continues good, and several contracts of good size have been closed up in the week. A large portion of the business comes from car works, which continue to have a large demand for their products, but the general business in bars has been good, also. Three or four agricultural implement contracts were closed last week. Prices are no higher, but are much firmer at the quotations. They are made at 1.05c to 1.10c for common iron, 1.10c to 1.15c for guaranteed, and 1.10c to 1.15c for soft steel bars from strictly billet stock.

CAR ORDERS.—No large contracts for cars were placed last week, but the business included several of small size, making a good aggregate. There are further orders in the market that will be placed in the near future. Mills are having a goodly number of orders for car material, and the business shows no signs of falling off.

RAILS AND TRACK SUPPLIES.—Rail orders closed last week were small, but there is a good demand, and sales are expected to be made steadily for some time to come. The recently revived price agreement is said to be fully as strong as the old one and quite likely to be maintained. Quotations are unchanged, as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—The only business in this market has been taken by mills farther East, and has not involved any large tonnage. Prices are unchanged at $17.50 for billets and $25.50 for rods.

STRUCTURAL MATERIAL.—No large contracts were let last week, and none are in the market at present. General business was good, and included several quite large lots. The total tonnage closed was fully up to the average. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—There has been a good demand and orders last week made a very fair aggregate. The larger part of the business closed was in small lots. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.40c to 1.45c; fire-box steel, 1.85c to 5c.

SHEETS.—Sales of the week included several for large lots, and the demand is keeping up exceedingly well. The mills are firm in their views, and are making no concessions to secure business. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 7½ per cent discount for galvanized.

MERCHANT STEEL.—Inquiries are getting larger all the time, and sales last week were very satisfactory to the mills. Some large contracts were closed. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—There is a considerable shortage in several grades of scrap, and it is reported that some of the larger dealers are heavily short of the market. Cast scrap is in special demand, and buyers have not been able to secure all they wanted. Transactions last week included several of large size, and one which is remarkable in that the metal was purchased by a railroad company which is usually a heavy seller of the same grade of scrap. This sale was of cast scrap. As a consequence of the heavy demand and light stocks prices on several grades have been advanced materially since our last report. Dealers' selling prices are about as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr., to	50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 25@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 25@ 7 50
Railroad forge, net	12 00@ 12 50	Mixed steel, gross	..... 7 00
Dealer's forge, net	9 50@ 10 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Jan. 26.

With the exception of bars, both iron and steel, and wrought pipe, January is proving a much more quiet month than December. Mails are lighter and tonnage booked smaller. The heavy inquiry on bars is charged to the demands of car builders. The rod appraisers to-day are at work on neighboring coke properties which are a part of a plant counted in the consolidation.

PIG IRON.—Prompt Bessemer iron in scattered lots is offering as low as $9.25 and $9.30 and a sale of 2,000 tons in Pittsburg is reported at $9.90. Furnaces as a rule are not ready to quote into the second quarter and $9.40 and $9.50 have been refused. The past two weeks have developed no conspicuous transaction in pig iron—Bessemer, foundry or mill Connellsville coke is held firmly at $1.65 to $1.75 and no sales below the former price are reported. Pig Iron quotations are made as follows:

Bessemer, prompt, valley	$ 9.25 to	$ 9.35
" first quarter valley	9 40 to	9 50
Bessemer delivered Pittsburg District,	9 90 to	10.00
No. 1 Foundry	10.50 to	10.65
No. 2 Foundry	10.00 to	10.25
No. 3 Foundry		10.00
Gray Forge	9.00 to	9.10

BILLETS.—For first quarter deliveries $15 to $15.25 is still quoted at the mills. January so far has developed little business in billets.

RODS.—For small lots of rods $24 has been given in the last ten days. The scarcity is being felt generally and no quotations can now be had below $23.50. The market is quoted at $23.50 to $23.75.

SHEET BARS.—Quotations are $17 to $17.25 maker's mill for first quarter delivery.

PLATES.—Buying by railroads is lively and boiler and fire-box orders continue at a lively pace. Mills quote: Tank, 1c; shell, 1.10c; flange, 1.20c.

STRUCTURAL MATERIAL.—The promises of December for structural business early in the year are not as yet fulfilled and both mails and orders are smaller than in December. As similar conditions are reported generally in finished material, iron and steel bars excepted, the higher pool prices on shapes are not charged with the lull. Buildings of good size are up for estimates in New York, Chicago and Cleveland that may put to a test the pledges of the beam pool. At present pool rates rule as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; zees, 1.15c; tees, 1.20c. Angles and universal plates are quoted at 1c.

BARS.—The activity in car shops is being felt in heavy inquiries for both iron and steel bars. As yet buying has not been heavy but a number of bona fide inquiries are pending that will become orders in a few days. Common bar iron is quoted at 95c, valley and 1c to 1.05c, Pittsburg. Steel bars are stronger in view of larger buying and 1c, half extras, is minimum.

IRON AND STEEL SKELP.—Skelp is quoted as follows: Grooved iron skelp, 1.07½c to 1.10c; sheared iron skelp, 1.17½c to 1.20c; grooved steel skelp, 95c to 97½c; sheared steel skelp, 1c to 1.05c.

PIPES AND TUBES.—The larger manufacturers, by common agreement, have returned to the old base discounts in use prior to last fall. For the present both sets are used by buyers, causing no little confusion to the mills, and the return to former cards is expected to stop the confusion. The base again in use is as follows: Butt weld, black, 57 per cent off; lap weld black, 67 per cent off; butt weld galvanized, 50 per cent off; lap weld galvanized, 55 per cent off. The additional discounts are six tens on car load lots and five tens and 5 per cent on less than car load lots. Discounts on merchant boiler tubes are unchanged as follows: 2¼ inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

SPELTER.—Sales of spelter are reported as high as $3.87½. Quotations are made as low as $3.75.

RAILS AND TRACK MATERIAL.—An unusual demand for links and pins is a feature in railroad material. The new girder rail mill at Homestead will start this week. T rails are quoted firmly at $18, Bessemer, and on track material we quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

FERRO-MANGANESE.—Domestic ferro-manganese, 80 per cent, is quoted at $47 and $47.50.

OLD MATERIAL.—The prospect of heavy demand for bars is resulting in increased inquiry for iron and steel scrap, steel rails and car wheels being in particular demand. Iron rails are reported sold as high as $14.50, gross and steel rails at $10.50, gross. Wrought scrap is quoted at $12, net. As usual car wheels are scarce in the Pittsburg market. They are quoted at $10 50 to $10.75, gross. Asking prices on all kinds of old material are higher.

CINCINNATI.

January 26.

There has been in the past week quite a movement in Southern pig iron and a number of sales as large as 2,000 tons have been registered. The situation, however, as far as regards the South is contradictory. The stocks of iron on hand there are very small, smaller than most of the furnaces have seen in their yards for many years. Order books are well filled and on some grades of iron there is really a shortage; that is, the furnaces are behind hand in deliveries. For instance, the largest of all the companies is decidedly short on No. 2 foundry and No. 1 soft and there is scarcely a furnace company that is not six or eight weeks behind on some of the grades, usually the soft irons. This would indicate a position of great strength. On the contrary, however, one or two companies have been shading schedule quotations. This has not been done to any great extent, though instances are reported, and it is now said that this is a thing of the past and that nothing except schedule prices will be accepted. Consumption if anything is on the increase, and inquiries are plentiful. Sales amounting to 10,000 tons of gray forge are said to have been made at $6.40 at furnace, but other bids at that price have been refused. The disruption of the Superior Charcoal Iron Co. has led to a scramble for business, and it is impossible to give exact quotations on that class of material. The circumstances of each trade and the location of the furnaces competing influence prices to a large degree. It is not believed that the owners of the charcoal furnaces will feel like selling their product at less than cost for a long period. After the first skirmish is over it is thought that prices will be restored to the normal condition. Several orders ranging from 500 to 2,000 tons have been placed by malleable works, and other deals are pending. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75 to $10; No. 2, $9.50 to $9.75; No. 3, $9.25 to $9.45; gray forge, $8.75 to $9; mottled, $8.75 to $9; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

BUFFALO.

January 26.

Business in this district has kept up to the pace set in the opening weeks of this month. Orders booked generally have been for 200 to 300 tons, while here and there one of 1,000 tons. The orders, in the aggregate, amount to considerable tonnage, and January this year seems to be striving to outdo all previous records for that month. Prices remain firm and shipments are going forward at a good rate. We quote below for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, $11 to $11.25; No. 2, $10.50 to $10.75; Ohio strong softener, No. 1, $11.50 to $11.75; No. 2, $11 to $11.25. Jackson Co. silvery, No. 1, $13.50 to $14; Southern soft, No. 1, $11.50 to $11.75; No. 2, $11.25.

PHILADELPHIA.

January 25.

There is little doubt of the effect of the large current production of pig iron on the market in this section. Heavy consumption is in evidence, but the increase in furnace capacity in January is a matter of common knowledge, a number of Pennsylvania stacks being added to the active list this month. While there are plenty of arguments to be found for a steady, if not a strong condition, the facts do not bear them out—at least so far as pig iron is concerned. A fair amount of business has been done in the past week, but at buyers' prices; and what is causing doubt of any such pronounced upward movement in later months as some in the trade have talked of, is the fact that sales for long deliveries are made at inside figures. Buyers are not anxious to cover; while an increased melt of iron is a matter of general experience, the irregularity of prices and the evident weakness of some sellers are more influential in determining the policy of consumers of pig iron. We quote No. 1X foundry at $11.75; No. 2X, $10.75 to $11.25; No. 2 plain, $10.40 to $10.50; standard mill iron, $10.25; ordinary mill iron, $9.75 to $10. No special activity is noted in billets. With little buying, there is at the same time no pressure to sell. Quotations are close to $17.25, and the feeling is firm. In finished material lines the experience is practically uniform—a large tonnage in all the mills, and with many of them orders for two or three months ahead, but all at low prices. Car, locomotive, shipyard and railroad trackage requirements are recognized as important sources of demand, with the implement trade as a large factor in farther Western mills. There is confidence that prices will pick up with the arrival of the spring trade, but no indications of such a movement as yet. We quote bars at 1.10c for common, and 1.15c for refined; plates and angles, 1.15c; beams and channels, 1.30c.

Alabama Mineral Production in 1897.

The production of minerals in Alabama during the year 1897, as reported by the producers to Eugene A. Smith, State geologist, is as follows: Coal, 5,114,129 short tons; coke, 1,252,624 short tons; pig iron, 839,293 long tons; iron ore, 2,112,400 long tons; limestone, 289,973 long tons; beauxite, 10,539 long tons; building stone, 133,160 cu. ft.; partial product of brick, 20,210,000; partial product of pottery, 10,000 gallons.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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G. H. GARDNER, President. A. I. FINDLEY, Editor.

CHICAGO:
1142 MONADNOCK BLOCK.
B. M. GARDNER, Associate Editor and Western Manager.

PITTSBURG:
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PIG IRON PRODUCTION IN 1897.

As was anticipated, the official statistics of pig iron production for 1897, which are published in the *Bulletin* this week, make that the banner year. Complete returns show an output of 9,652,680 gross tons, as against 8,623,127 tons in 1896, a gain of 1,029,553 tons.

The production of Bessemer pig iron last year was 5,795,584 gross tons, as compared with 4,654,955 tons in 1896, an increase of 1,140,629 tons, showing that the output of foundry and forge irons, was a trifle less last year than in 1896.

Basic iron shows a very considerable gain over 1896. In that year, the first for which statistics of basic iron output were gathered, the total was 336,403 tons; for 1897 it was 556,391 tons. Pennsylvania alone produced 350,068 tons last year, or more than the entire country in 1896. Allegheny County's product was 265,548 tons. Southern basic, almost entirely from Alabama, amounted to 97,562 tons.

The production of pig iron in the second half of 1897 was enormous, being over 5,000,000 tons. One half-year alone exceeded it—the second half of the boom year 1895, when 5,358,750 tons were produced. Consumption for 1897 was well above 10,000,000 tons, quite the largest in the history of the trade.

In connection with the figures, of which at this hour we can give but the bare synopsis, the *Bulletin* very truly says of the present outlook in the iron trade that "it is like the weather, variable. Prices are weaker than they were only a few weeks ago. Steel rails bring only $18. Collections are often difficult to make. On the other hand, consumption is still very active and it promises to continue active for some time to come. There are fewer idle iron or steel works than a year ago, and fewer idle iron or steel workers, but competition is deadly and many works are operated without profit. Altogether, the iron trade situation at the present time is not particularly cheering. A large volume of trade with an uncertain margin of profits is not a healthy state of affairs for the manufacturers. What is wanted is an advance in prices."

IRON AND STEEL EXPORTS GROWING.

The statement of November exports of iron and steel, just available, is an encouraging one. The Southern pig iron movement was large in that month, nearly 37,000 tons of pig iron going from all ports. Steel rails were also a large factor, and wire, wire rods, structural material and scrap made good contributions to the total. The detailed statement for November in 1896 and 1897 follows, together with the 11 months' totals in the two years:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	November.		Jan.—Nov.	
	1896.	1897.	1896.	1897.
Pig iron { ferro / all other }	9,755	{ 771 / 36,942	44,736	{ 4,652 / 231,850
Scrap	26	2,672	1,129	38,343
Bar iron	207	437	3,255	4,181
Steel bars (not wire rods)	720	639	7,452	38,054
Iron rails	15	240	578	5,313
Steel rails	6,045	19,853	61,578	128,669
Billets, ingots and blooms	(b)	639	(b)	4,320
Hoop, band and scroll iron	14	304	265	1,298
Wire rods	(b)	1,597	(b)	9,760
Iron sheets and plates	98	683	522	3,913
Steel sheets and plates	136	617	817	4,709
Structural material	(b)	2,668	(b)	13,041
Wire	3,233	4,715	32,884	48,731
Cut nails	328	857	9,720	14,032
Wire nails, / Other, including tacks }	219	{ 1621 / 133	9,514	{ 5,361 / 3,041
	20,786	75,388	172,550	559,249

(b) Not separately stated prior to July, 1897.

An aggregate of 559,249 tons of iron and steel proucts, apart from machinery of all descriptions, bicycles, implements, etc., is an excellent showing. What is more, if the November rate (75,000 tons and upward) were kept up for a year, it would amount to the splendid total of 900,000 tons. An annual export movement of 1,000,000 tons is by no means a remote probability.

NATIONAL ASSOCIATION OF MANUFACTUERS.

The third annual convention of the National Association of Manufacturers opened at New York on Tuesday with an attendance and an interest promising large results. The address of President Search found a good text in the revival of industrial life throughout the country in the past year, and the work of the association in facilitating trading with foreign countries came in for proper recognition. One of the great problems yet to be settled in connection with outer trade, President Search urged, is that relating to shipping, and the familiar position of the association, in favor of Government subsidies to secure direct lines to South America and other ports was reaffirmed. One matter to which the president referred in his address is bound to have increasing attention from manufacturers—the increasing disposition of the State legislatures to impose special taxes on corporations whose residence or whose plants are in other states. This method of levying tribute upon a corporation that essays to do business in a State other than its home State is a species of restriction upon inter-State commerce which we believe is in conflict with the Federal Constitution. The inconsistency of the enforcement of some of these statutes is seen in the fact that while firms may do business at will in States other than their own, the incorporated company is pounced upon as a special subject for tribute.

The work of the National Association in establishing sample warehouses in foreign countries is a factor in the development of outer trade, that promises to be of increasing importance. The Venezuelan warehouse is but the first of many that can be established, to the profit of our manufacturers and the encouragement of those who have undertaken to push their products in other countries.

Other questions of importance that will come up at the present convention are special measures for trade extension with Mexico; the agitation of needed reforms in patent laws; and further educational work in behalf of the creation of a Department of Commerce and Industries. The presence of President McKinley at the banquet of Thursday night gives more than ordinary import to the convention of 1898, and argues the profound interest of a business administration in the rapid development of the industries of the country in the period of larger endeavor upon which we certainly have entered.

The American Steel and Wire Co.

Progress toward the completion of the proposed organization of the wire and wire rod manufacturers of the United States has been made steadily, and the confidence of the promoters in a successful outcome is stronger with each week. The application for leave to incorporate has been on file in the secretary of state's office at Springfield, Ill., since Jan. 4. Meantime certain proposed by-laws of the company have been submitted to Illinois officials for approval. The incorporation fee, on a capitalization of $87,000,000 would be $87,000. This has not been deposited as yet, and will not be until the new company becomes a certainty and its residence has been settled. The expenses of the preliminary work—the services of appraisers, accountants and expenses of promoters—are estimated to aggregate about as much as the incorporation fee. Thus it would appear that whoever is responsible for this bill has a strong incentive for the perfecting of the organization.

Barring a coke plant appraisal, now being made, the work of the appraising committee is completed. The accountants from the London firm of Jones, Cæsar & Co. have finished their work on the books of the various concerns, and the results are now being canvassed at New York preliminary to the final adjustments of terms. It is understood that propositions differ. In a few cases a cash purchase will be made. In other cases part cash and part preferred stock will be given, each share of preferred stock carrying with it one share of common stock. In the case of one important company the proposal submitted is for the purchase of a controlling interest in its stock, with the stipulation that all other stockholders may dispose of their holdings to the big corporation on a like basis.

There has been and could not be any election of officers, because stock in the new company has not been issued, and in fact there is no corporation requiring officers. Mr. Geo. T. Oliver is still considered the probable president, and in connection with the directory the names of H. W. Oliver, of Pittsburg; Wm. Chisholm, of the Cleveland Rolling Mill Co.; Stuart H. Chisholm, of the HP Nail Co.; Wm. Patterson, of the New Castle Wire Nail Co.; Wm. Edenborn, of the Consolidated Steel & Wire Co., and Wm. E. Rice, of the Washburn & Moen Mfg. Co. Philip W. Moen and E. J. Buffington have been named also in connection with official positions.

EDWARD M. HAGAR, M. M. E., and Samuel A. Mendenhall, M. E., have formed a partnership under the name of Edward M. Hagar & Co., and have offices in the Rookery, Chicago. For the past three years Mr. Hagar has been representative in Chicago of the Southwark Foundry & Machine Co., of Philadelphia, for the sale of that company's Porter-Allen engines, blowing engines, pumps, etc., and the new firm will continue the representation. It is also their intention to do a general contracting business in the machinery they handle. Both Mr. Hagar and Mr. Mendenhall, from education and experience, are capable of handling a large business successfully, and there is no doubt that they will be able to secure their share of the business placed in their territory.

DEATH OF JOHN R. THOMAS.

John R. Thomas, president of the Thomas Furnace Co. and the Niles Fire Brick Co., died Tuesday night, Jan. 25, of bronchial pneumonia. Mr. Thomas was one of the best known manufacturers in the Mahoning Valley, and the news of his death will be heard with great regret. He was 64 years of age, and was born in Wales.

Another Book by Mr. Swank.

NOTES AND COMMENTS on Industrial, Economic, Political and Historical Subjects. By James M. Swank. 12mo; 228 pages. Price, $2. Philadelphia: 1897.

In his "Iron in All Ages," Mr. Swank did the iron trade of the United States a service that will be more and more appreciated as years pass. In the volume before us, which comes from the press simultaneously with the completion of the labors of 25 years by the author, as secretary and general manager of the American Iron and Steel Association, he has gathered together some of his editorial contributions to the *Bulletin* that are of largest permanent interest and import. These 25 years cover a period of tariff and industrial history unequaled in epoch-making importance. Moreover, Mr. Swank has had to do, as has no other man, with shaping the tariff schedules in iron and steel in this quarter century. His comments upon the tariff policy of the United States, his history of its development, and his chapters on the British motive for the breaking down of our industrial bulwark, are therefore in the highest degree authoritative. The intimate relation between our industrial evolution since the war and our politics has made the author a close student of political history, and on this side the work has an added value. Mr. Swank's penchant for history, and particularly for the beginnings of our magnificent iron industry, is illustrated in the chapters on "Our Colonial Iron Industry," "Remarkable Development of our Iron and Steel Industries Since 1860," "Revelations of an Old Ledger," and "Early History of Pittsburg," portions of which were transferred to these columns at the time of their original appearance. Somewhat in line with the theme of Mr. Wells's "Recent Economic Changes" are the chapters on "Abandoned New England Farms," "Cheapening the Necessaries of Life," "Drift of Population to the Great Cities," and "The Western Farmers' Discontent." Clearness of statement, forceful accumulation of argument and the massing of facts in support of them, a faculty for measuring the causes and sweep of industrial and economic movements, and rare ability in getting at the pith of things—these characteristics of Mr. Swank's editorial work are conspicuous in "Notes and Comments." The volume is a fitting commemoration of 25 years of arduous and resultful labors for the country's pre-eminent industry.

THE Youngstown (O.) Steel Roofing Co. is about to increase its capital to $50,000 and make some important improvements looking to the extension of its business.

BURR AUTOMATIC SAFETY LIFT.

An improved self-locking tackle block adapted to a wide range of uses in the rapid and economical handling of shop and construction materials is manufactured by the Burr Mfg. Co., Society for Savings Bldg., Cleveland. Its automatic action and its self-adjustment are among its prime features. On the score of convenience and economy the place it takes is indicated by the fact that it serves the operator in the capacity of a third hand. With one hand co-operating with the safety-lift, he can place material to be worked upon a machine, lifting what would be an impossible burden without the ropes and pulleys, the other hand being free for a more perfect adjustment of the material to be worked, or of the machine itself. The Burr lift will lock, without failure, whether hanging straight, upside down, lying flat or at any angle; and the fact of the rope being wet or greasy does not affect the action of the locking device, the load being sustained at any point without fastening the rope. On the other hand, unlocking is easy. The cut showing the relation of the parts when the lift is "open" and hoisting a load, makes it clear that when the rope is pulled to lift the load the rear end of the rock lever is pulled down, the sheave rocks carrying the hoisting rope away from the lock, and the hoisting is done the same as with a common block. When the hoisting rope is released, as shown in the cut marked "closed," the load pulls down the front arm of the lever, swings the sheave forward and clamps the rope against the lock, securely sustaining the load wherever desired. Increased load increases the pressure to hold the rope.

OPEN.

CLOSED.

No part of the lift can be worn out by ordinary usage, as there is no wedge, no eccentric, spring, or teeth to require repair. The brake against which the rope is locked is perfectly smooth and can do no injury to the rope. In the ordinary rope block the brake consists of a wedge or eccentric that must be rough enough to bite into the rope to lock at all; when worn smooth, these wedges and eccentrics will not hold the rope; when rough, they soon wear it out.

These lifts are especially suited to the requirements of foundries, machine shops, railroads, builders, butchers, masons, warehouses, lumbermen, quarries, millers, painters, steamboatmen, wire fence builders, telegraph linemen, farmers, marine service, and all places where material is to be raised, lowered or moved.

The Burr lift is made of the best selected steel. It is the purpose of the manufacturers to bring out a smaller size in which small wire rope or band will be substituted for the rope as shown in the cuts.

25 Years With an Important Industry.

In connection with anaccount of the dinner given recently at New York by Vice-president and General Manager E. C. Converse, to his associate officers and others connected with the National Tube Works Co., *Leslie's Weekly* gives a portrait of Mr. Converse and a cut of the solid gold loving cup presented to him by his guests. As noted in these columns at the time, the dinner celebrated the end of 25 years of Mr. Converse's connection with the company. *Leslie's Weekly* has this interesting bit of personal history, after referring to Mr. Converse's birth in 1849, his training at the Latin School of Boston and the Boston English High School:

"In 1872 he applied to his brother-in-law, J. H. Flagler, the general manager, and to his father, James C. Converse, then president of the National Tube Works Co., for a position at the new works of this concern at McKeesport, Pa. Although his father was president and his brother-in-law the general manager of this company, he was engaged entirely on his own merits, as the position he was offered was that of storekeeper at $450 per year. He accepted, and still has his letter of appointment, of which he feels justly proud. He inaugurated the system of rigid inspection of skelp iron, which has every since existed at this company's works. He rapidly gained detail knowledge of the business by the study of metallurgy and kindred matters, oftentimes spending his evenings in welding, heating and other work, to obtain a practical knowledge of the business. From the position of storekeeper he was promoted to that of iron inspector, thence through all the gradations to general manager and to vice-president in January, 1894, which office he now holds. Mr. Converse attained this advancement entirely through his own industry and energy. Besides being an officer and director in many corporations allied to the iron industry, he is president of the National Standard Insurance Co., and a director in many other prominent institutions, including the Liberty National Bank in New York City, First National Bank of McKeesport, the National Surety Co., the American Bank Note Co., and the Assurance Co., of America. It is rare to find, in the iron business especially, a master so thoroughly competent in practical and mercantile knowledge as Mr. Converse. His inventions are numerous, the most important of which is his Converse patent lock-joint water and gas works system. Up to 1882 a perfect connection for wrought iron pipe, without cutting threads, was unknown. After inventing the joint he perfected the system in all its details, and at this writing it is considered to be the only perfect joint in the world for wrought iron water and gas works systems. The sales from this department alone have amounted to millions of dollars.

"The great development of the National Tube Works Co. rendered it necessary for Mr. Converse to take up his headquarters in New York City some years ago, and from which point he manages the entire company's vast interests. Either his modesty or disinclination has kept him from appearing in the public eye, but if men of his worth could be secured for public office there would be less of the general outcry against the degeneration of our social and political system."

A BILL in equity was filed against the Reading Foundry Co., Reading, Pa., on Jan. 22, by several of its largest creditors asking for receivers, and later George W. Harrison and Peter D. Wanner, the latter president of the company, were named as receivers. The liabilities are given at $360,000 and the assets at $250,000. President Wanner attributes the trouble to demoralization and low prices in the pipe trade, and says the company has made no money for five years. It employs 300 hands. Efforts will be made to continue the plant in operation.

Review of the Technical Press.

[Translations, Condensation and Comment expressly for The Iron Trade Review by Dr. Richard Moldenke.]

Briquettes of Ore Dust for Open-Hearth Steel.—*Chemiker Zeitung*, Jan. 8, reviews an article by P. Klein in the *Rigaer Industrie Zeitung*, on the Imperatori process of making briquettes of ore dust as applied to the Siemens-Martin process. The problem was to make use of ore dust in the blast furnaces and steel works in the Urals. It was found impossible to obtain paying results for the first mentioned purpose. For steel making, however, it was different. The ore dust and crushed charcoal were mixed dry, and slaked lime added to make a plastic mass suitable for brick making. The bricks weigh about 15 lbs. each. The ore contained 86.25 per cent oxide of iron, which would require 9.6 per cent carbon to make carbonic acid, or 19.3 to make carbonic oxide. The briquettes were dried in the air and then ignited, held their form well, and on cooling were found to be a porous mass having the properties of spongy iron, the carbon remaining being 0.18 per cent. In making these briquettes, a reduction of the charcoal contents had a tendency to produce more slag, and when a minimum of charcoal was taken, even at the most intense heat, the slag formed would not leave the iron sponge. There must be enough carbon present to correspond to a formation of carbonic oxide. Experiments on an extended scale show that the ordinary ore or scrap process entails a loss of 15 per cent in the weight of iron, while with the Imperatori process there is an actual gain of 10 per cent due to the formation of the sponge just described.

Tests of Cast Iron Columns.—*Engineering News*, of Jan. 13, describes the tests made by the Department of Buildings of New York City, on full sized cast iron columns. The tests were made by Mr. W. Ewing at the works of the Phœnix Bridge Co., whose hydraulic testing machine is the most powerful in the world. As it was important to insure accuracy, a comparison was made with the Emery testing machine in the U. S. Arsenal at Watertown, Mass. This was done by testing a specially built column in the Emery machine with loads of constant increments. Two marks 200 inches apart were checked up by a special roller extensometer of delicate construction. The column was then shipped to the Phœnix works and the tests repeated under the same conditions. An elaborate series of results thus obtained for purposes of comparison served to calibrate the Phœnix machine. The breaking tests are next taken up in detail, and a table summarizing the results is elaborated by the *Engineeing News*, the report of the Building Department giving only the data. Ten columns were tested, the breaking load ranging from 22,700 to over 40,400 lbs. per square inch of area. In one instance the capacity of the testing machine, 2,033,000 lbs., was reached without breaking the column. The materials tested were said to be fair samples of cast iron used in New York buildings and were passed by the Department as coming within the provisions of the law. It is interesting to note the heavy compressions of the columns, one of them losing $2\frac{1}{16}$" in 8' 3" under a load of 1,632,000 lbs. The table gives food for thought, however, for in it we read of flaws, so-called foundry dirt, honeycombing, cinder pockets, etc. Then again, the fracture of some of the columns showed a coarse grain, and in others it was fine, showing that uniformity, and a standard material for this class of work is yet to be attained. *Engineering News* now applies Gordon's formula for pillars to the data, and finds that some of the columns have a factor of safety of a little over 2, whereas the law calls for 5. In the issue of Jan. 20 the consideration of this subject is confirmed, the statement being made that not only were these tests of cast iron columns the most important ever made, but that they show the utter worthlessness of Gordon's Formula, and the coefficient commonly used in the formula, as applied to cast iron columns. Cast iron columns have been long known to be treacherous, and are little used for important work at the present time, and then only when greater cheapness is desired. This severe criticism is only too true, and shows us that either little is known about making castings for this purpose, or not enough care is taken to fulfill all the conditions required to give a cast iron column its load in the proper and safe way. Again, should neither of the foregoing points cover the case, we are evidently using cast iron where it does not belong, and this does not look right, for with properly planed ends, good metal and design, well prepared beds, there are few materials better able to resist compression without shock than cast iron. Indeed, one of the columns tested readily bears this out. Hodgkinson's experiments are now gone into fully to show how insufficient a basis there is for Gordons formula. While it seems almost a sacrilege to advocate the overthrow of Gordon's or Rankin's formula, yet as we advance in our knowledge of structural material, aided by improved testing machinery, changes become necessary, and *Engineering News*, quoting Lanza, advocates stricter methods for calculating pillars, which if adopted would soon, as stated, send the cast iron pillar out of the market in favor of the steel column.

In another part of the same issue of Jan. 20, the results of a series of tests is given, bearing upon the subject of brackets on cast iron columns. The tables and illustrations are very interesting, and it is frankly stated that a calculation of the probable breaking strength of a bracket on a cast iron column on any scientific basis is a practical impossibility. So many items would have a modifying influence that the probable strength can only be approximated. The conclusions derived are: That a bracket will not usually break through the metal of the bracket itself, but will be torn away from the column, leaving a hole. That brackets projecting 4 to 5 inches from columns will bear only one-half as great a load when applied at the end, as when the load is distributed over the whole shelf of the bracket. That the shelf of the bracket must be so made that the load can be carried as close to the column as possible, and no likelihood of a concentration on the outer portion may occur.

THE TIN PLATE MARKET.

The past week has been an uninteresting one as far as volume of trading is concerned, but the proposed tin plate combination, referred to a week ago, has caused much discussion and comment in the trade generally. It is claimed that the plan to organize all of the tin plate mills after the manner of the new wire trust has been taken up actively by strong financial interests, well able to carry it through successfully if the mills can agree among themselves what should be done. It looks as if it would be an opportunity for many of the mills now meeting with indifferent success to sell out. The trade at large does not take very much interest in the negotiations, and the larger buyers claim to be indifferent in the matter, as they have some plates bought and if the market is uniform and alike to all, they are perfectly willing to pay better prices for their plates. It certainly looks as if the time is ripe for a combination of this kind.

The month of January is usually one of active trading in tin plates and many of the larger manufacturers and can makers cover their spring and early summer requirements during this month. This year has been an exception, and it would seem that the talk of trust or combination, instead of influencing buyers to go into the market, has caused more distrust of it, and has resulted in comparatively little trading.

We quote as follows f. o. b. Pittsburg or Indiana district:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb.	Basis weight,	$2.90
100 lb.	" "	2.80
95 lb.	" "	2.75
90 lb.	" "	2.70
85 lb.	" "	2.65
80 lb.	" "	2.60

TERNE PLATES.

IC, 216 lb., 20 x 28	$5.85
200 lb. "	5.55

Prices above mentioned show a concession of about 5c per box from those named last week and even these have been shaded on some large and especially desirable contracts.

At the annual meeting of the Western Pennsylvania Engineers' Society, last week, the following officers were elected: President, G. S. Davidson; vice-president, W. A. Bole; directors, C. F. Scott, Gustave Kauffmann; secretary, R. A. Fessenden; treasurer, A. E. Frost.

TESTS OF SPECIAL WHEELS AND AXLES.

A series of tests on railway wheels and axles of special quality was made on Jan. 21 by the New York Car Wheel Works and the P. H. Griffin Machine Works, Buffalo, under the auspices of the Central Railway Club and in the presence of about 100 railway officials from the Middle and Eastern States and Canada. The tests were made under the supervision of a committee appointed by the Central Railway Club at its November meeting. The details of the requirements were given in our last issue. The results of the tests were as follows:

Thirty-eight-inch diameter wheel made to Austrian State Railway specifications. Weight 860 pounds. Wheel to stand 8 blows. Weight of 475 lbs. dropped 3¼ feet, increasing by 1½ feet to about 19½ feet. 1st to 9th blow—no effect. At ninth blow small crack in tread four inches long, gradually extending to 12 inches at twelfth blow. 13th to 18th blow—no change. 18th to 21st blow—crack extended to plates. 21st blow—crack extended through both plates around hub to tread on opposite side. 22nd blow—wheel broken into two pieces. Chill, five-eighths and three-quarters inch.

Austro-Hungarian test applied to 33-inch, 650-pound wheel, Pittsburg, Bessemer & Lake Erie specifications for 100,000 pound capacity cars: 1st to 7th blow—no effect. 7th to 15th blows—small cracks developing and extending through tread and plates. 16th blow—wheel broken into two pieces. Chill, $\frac{9}{16}$ and ⅝ inches. Under the Austrian State Railway test the wheel was required to stand eight blows in all without being broken in pieces. It will be seen that in the first test given the wheel stood eight blows without the slightest effect.

Under the German State Railway test the wheel tested was 33 inches in diameter. Weight, 650. Master Car Builders' specifications for American railways. Wheel to stand six blows. Weight of 475 lbs. dropped five feet, increasing by half meters to 13 feet: 1st to 14th blow—no effect. 14th to 16th blow—crack extended through hub and plate. 16th blow—wheel broken into two pieces. On this test the wheel is required to stand six blows in succession before being broken into pieces, and the wheel tested stood 13 blows with no effect whatever.

French State Railway test applied to 33-inch, 650 pounds wheel. Lake Shore & Michigan Central Railway specifications for locomotive tenders. Wheel must stand 3 blows. Weight of 2,200 lbs. dropped 14½ feet. 1st to 6th blow—no effect. 6th blow—crack eight inches long in throat, parallel to flange. Crack through rim of wheel at bottom to single-plate. Wheel unbroken and test discontinued.

Belgian State Railway test applied to 39-inch wheel. Weight, 900 pounds. Grand Central Railway of Belgium specifications. Wheel must stand 5 blows. 1st to 7th blow—no effect. 8th blow—wheel broken into two pieces. Chill, $\frac{1}{2}$ and ¼ inches.

Master Car Builders' test and 33-inch wheel. Weight, 600 pounds. Master Car Builders' specifications. Wheel must stand 5 blows. Weight of 140 lbs. dropped 12 feet. 1st to 26th blow—no effect. 27th blow—small crack in bottom plate. 28th blow—crack extended to a length of eight inches. 28th to 47th blow—no change. 48th blow—crack through flange. 49th to 85th blow—cracks gradually extending. 86th blow—wheel broken into two pieces. Chill, $\frac{9}{16}$ and ⅝ inches.

Pennsylvania Thermal test. Wheel, 33 inches in diameter. Weight, 600 pounds. Pennsylvania Railway specifications. The molten band 1½ inches wide and four inches deep was cast in 14 seconds and the wheel stood the test without failure of any kind.

Bursting test. Axle with five off-sets was forced to the maximum pressure of a 100-ton hydraulic press, into the bore of a 33-inch, 650-pound, Pittsburg, Bessemer & Lake Erie wheel with no effect on the wheel. The axle at its largest diameter was $\frac{5}{64}$ inch larger than the bore of the wheel into which it was pressed.

Heading test of axles of standard and special quality. Special cold-rolled steel axle, 3⅜ inches diameter, resting on supports 6 feet 6 inches apart, was pressed out of line ¼ inch and allowed to spring back. No effect. It was then pressed out of line ½ inch and pressure released. No permanent set. It was then pressed out of line ¾ inch and pressure released. No permanent set. It was then pressed out of line one inch and pressure released. Permanent set, ⅛ inch. The result of this test showed that a special axle would withstand a blow that would bend it ¾ inch without the slightest effect in the way of a permanent set or bending.

A similar test was then applied to a standard steel axle, Master Car Builders' specifications, for 50,000 lbs. capacity cars. Diameter, 4½ inches in center at smallest point. The axle was pressed out of line ¼ inch and allowed to spring back. No effect. It was then pressed out of line ½ inch and allowed to spring back. Permanent set, $\frac{1}{16}$ inch. It was then pressed out of line ¾ inch and pressure released. Permanent set, ⅛ inch. It was then pressed out of line one inch and pressure released. Permanent set, ⅛ inch.

Another test then followed with a special quality cold rolled steel axle which was bent one inch out of the straight line in the center and pressure released. Permanent deflection, $\frac{1}{16}$ inch.

Test of special quality cold rolled axle, four inches in diameter, six feet five inches long. This axle was bent cold under hydraulic press until the ends were brought together. No defects of any kind appeared. The special feature of this test was that it was made on exactly the same quality axle as were subjected to the tests for bending and deflection, indicating that the strength and toughness were equal to the elasticity of the axle. A sample of a similar quality axle was exhibited which had made a mileage of 120,000 miles with less than $\frac{1}{32}$ inch wear. The intention of the axle test was to demonstrate the elasticity, toughness and wearing qualities of the material of which the axles were composed. The workmanship was of superior quality, the axles being guaranteed true to the three-thousandths of an inch.

These axles are primarily intended for electric service, where the highest qualities of strength and resistance to wear are required, but they are also recommended for the highest grade steam service on account of possessing the qualities most desirable for the same.

In addition to the tests referred to, the P. H. Griffin Machine Works and the New York Car Wheel Works were thrown open throughout to the visiting officials, and the process of manufacturing and finishing wheels was inspected in every detail from the melting of the iron to the completion of the finishing work. An exhibition was also made of the special qualities of charcoal iron used in the manufacture of the special wheels tested, and by means of which it is possible to attain the exceptional results obtained on the tests.

It should be stated that the European tests referred to above are intended for steel-tired wheels only, and in erecting the necessary testing machinery and subjecting chilled wheels to such severe tests it was designed to prove that chilled wheels could be made equal to, if not superior in strength and wearing qualities to any steel-tired wheels, and at less than one-third the cost. The chilled wheel further has a scrap value of about 50 per cent of its original cost.

Personal.

Charles McCrery, for the past four years assistant general manager of Dunbar Furnace and for six years previous superintendent of the Troy Steel & Iron Co. furnaces, has been made superintendent of the Duquesne Furnaces of the Carnegie Steel Co., Ltd., the appointment effective Feb. 1.

Frank A. Rogers has resigned as general manager of the Card Electric Co., Mansfield, O. For 14 years Mr. Rogers was with the Brush Electric Co., of Cleveland, and later with the Short Electric Railway Co.

E. P. Martin and E. Windsor Richards, whose tour of the steel plants of the United States was referred to last week, have visited Chicago, Cleveland and Lorain in the interval. They will sail for England on Saturday.

F. L. Grammar has resigned as superintendent of the Duquesne Furnaces of the Carnegie Steel Co., Ltd., to accept a similar position at the furnaces of the Lackawanna Iron & Steel Co.

After sharp competition with German manufacturers who have furnished Russia many locomotives, an order for engines for a suburban road in Russia has just been awarded to H. K. Porter & Co., the Pittsburg manufacturers of lighter types of locomotives. Influence and preference were in favor of the German manufacturers, but the order went to Pittsburg because of better construction and better adaptability to the service required.

ELECTRIC HAULAGE FOR MINES.*

BY D. C. THOMAS.

Within the last ten years great strides have been made with the electric motor for hauling coal along the main roads of mines. While there have been failures in the use of this power, they have generally been due to the fact that persons who tried to apply it did not understand the requirements of the mine; yet to-day there is no doubt that electric motors are as much a success in mines as they are along the streets of a city. Some nine or ten years ago when electric cars were introduced in this city many were in doubt as to their success. At that time electric motors were being tried in several mines of this country, and some doubted their success also; but the advanced state of machinery was such that when the electrician and machinist understood what was required for a good mine motor they were not long in fulfilling the requirement. The first thing to be decided, upon the introduction of electric haulage, is the weight of motor needed. This is one of the most important points; but how is the mining engineer or mine manager to know? First, he must find out about the maximum grade he expects to maintain in his mine. While this cannot always be ascertained accurately, it can be approximated, apart from exceptional cases. It is not always safe to depend upon the advice of the maker or his agent for information on the weight of motor to be used. They are anxious to sell and may advise a lighter motor in order to reduce the first cost of installing the plant. After deciding the maximum grade, the distance the coal must be hauled, and the amount to be hauled, by comparing with some other motor in use, a fair judgment can be formed as to the weight of motor required. I have found that a 10-ton motor, traveling at the rate of six or eight miles per hour, can haul 18 loaded cars weighing 1,300 pounds each, with 4,000 pounds of coal up a 2% grade, if the cars are in fair condition, with 16-inch wheels, and kept well oiled.

After deciding on the weight of motor the next thing will be the size of rail needed. A 25-pound rail for a 7½-ton motor and 30-pound rail for a 10-ton motor will make good tracks. The tracks should be kept as dry as possible. When it is very difficult to keep them dry, and where the bottom is soft, it can be expected there will be much trouble with the tracks, and I do not believe it would be a desirable system under these circumstances. Curves should be made of as long radii as possible, yet it is surprising on what short curves they can be worked. The track is an important thing and care should be taken laying it. On short curves guard rails should be used; also opposite the frogs. Try and have no curve to exceed 25-foot radius. A good rule is to lay a straight edge 10 feet long against the inner side of the top of the outer rail, then measure from the five-foot mark of the straight edge to the inner side of the rail. This distance should not exceed six inches. The height of outer rail should be measured with the 10-foot straight edge as given in the above rule and one-third of the distance to the rail makes a good height for the outer rail. Stub or point switches can be used with equal success. A motor for a 42-inch gauge track should be built 41¼ inches inside of flanges which will give a wider wearing surface to the tire and a much longer use.

The next in order will be the location of surface machinery. Locate the boiler near the engine, so as to have as dry steam as possible. The pressure should be kept up to the engine builder's limit. Locate the dynamo in a dry place. Build good foundations for both engine and dynamo, as it is not so much the pull as the vibration; and for high speed machinery a solid foundation is important. Do not cut the bolts shorter than the maker sends them. If you build the foundation of brick, a good way is to dig a hole of the required size down to hard ground, then lay brick in cement and grout every other course, building solid against the side of the ground to the surface, then tapering to suit the machinery. It is important that everything be kept clean in the dynamo room and no loafing should be allowed there. The dynamo should have one-quarter more power than the motor.

If the mine is a drift, the work of wiring will be simple. If a shaft, use insulated wire to the bottom; usually the air shaft is used. If the shaft is wet, run the wires through a pipe hung in the shaft. If the wire is to be carried down a drill hole, or the shaft be deep, much more care should be taken, using wire that is well insulated and has a lead covering. Along the hauling road some means of supporting the hangers must be used. A good way when the roof is suitable is to drill two holes about 2 inches in diameter, 10 inches deep and 1 foot apart crosswise over one of the rails; then drive wooden plugs in the holes. As it is important to have the hangers of uniform height above the rails, the plugs should be long enough to allow them to be sawed off at the proper height above the rails, then nail a piece of wood 1½ x 4 x 14 inches on to the ends of the plugs, using about three 20-penny spikes to each plug. This gives a good support for the hangers and will give no trouble afterwards. [Further details follow as to wiring and bonding.—ED.]

The mine cars should be kept in good running order. It will require more repair work on cars than when hauling with horses. Use center bumpers and be careful not to get them too round, so the cars can be pushed as well as pulled. Pin and link are about the best coupling.

Some may object to using electric power in mines giving off any fire damp. When naked lights are used there should be no fear on this point, as there is no danger where 250 volts are used. How much higher voltage can be used with safety the writer cannot tell.

At some places three tracks are used at the inside or gathering switches. Unless very long trains are used this is not needed. By a little practice, running switches can be made that would surprise any one not acquainted with the system. This leaves the motor ready to start out with loaded trip by the time the empties have run in on the siding. If the motor has any spare time it should be used at the shaft bottom, or at the hoppers to block down trains, thereby saving much labor. Longer sidings are required than with horses, or horse haulage. At the hoppers, if a drift mine, or at the bottom if a shaft, three tracks should be used, as it would be too much risk and a loss of time to dumpers or cagers to make running switches.

The old proverb, "A stitch in time will save nine," was never more applicable than in the use of electric power. What may be a small matter to-day that would only require a few minutes to make right, to-morrow may be serious and cause delay for hours. Every person in charge of a motor should be educated to understand this, and be held responsible to a reasonable degree for the care of the motor. The old slash-and-bang policy that has been practiced so much in mines will prove a failure with this power. Nothing beats well-directed energy.

By observing the foregoing, there is no reason why any one cannot have a haulage that will give satisfaction. The writer has had opportunity to observe steam locomotive haulage, rope haulage, and electric haulage, and prefers the latter for health of employes, adaptability, and minimum of care.

*Extract from a paper read at the meeting of the Ohio Mining Institute, Columbus, O., Jan. 20, 1898.

TRACK elevation in Chicago is to be extended for 22 miles, according to new ordinances just prepared. This will involve the construction of several hundred subways and will cost about $2,000,000. The work is as follows: Chicago, Burlington & Quincy R. R., Blue Island Ave. to W. 48th st.; Chicago & Northwestern Ry., Blue Island Ave. to 12th st.; Chicago Terminal Transfer R. R., Blue Island Ave. to Kedzie ave.; the tracks of the Pittsburg, Cincinnati, Chicago & St. Louis Ry., the Union Stock Yards & Transit Co., and the Chicago Terminal Transfer Co., from 12th st. to 39th st.; the tracks of the Chicago & Alton R. R., Madison & Northern R. R., and Atchison, Topeka & Santa Fe Ry., from 18th st. to Western ave.

THE world's production of copper, in 1896, says *Le Genie Civil*, was 387,207 metric tons, as compared with 339,699 tons in 1895. Of this total the United States furnished 212,112 tons in 1896, and 175,294 tons in 1895. Germany furnished 20,300 tons of copper in 1896, and Sweden produced about the same. The same journal places the nickel production of the world, for 1896, at 6,280 metric tons. Of this total, 2,972 tons came from New Caledonia, 1,541 tons from Canada, 90 tons from Norway, and 1,677 tons from the United States. The totals in 1895 were 5,617 tons; in 1894, 6,654 tons.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, Jan. 19, 1898, at the Great Northern Hotel, Chicago. In the absence of the president, Wm. Ferguson, vice-president occupied the chair.

The following were present:

R. S. McPharren, E. P. Allis Co., Milwaukee, Wis.; S. H. Whitaker, Dayton Coal & Iron Co., Cincinnati; G. H. Carver, Jacob Ott, Plano Mfg. Co., West Pullman, Ill.; F. L. Abbott, South Chicago Analytical Laboratory, South Chicago; Wm. Ferguson, Gates Iron Works; A. Sorge, Jr., consulting engineer; B. M. Gardner, *The Iron Trade Review;* Maj. Malcolm McDowell; E. E. R. Tratman, *Engineering News;* A. M. Thompson, Link Belt Machinery Co.; A. W. Bodell; H. S. Vrooman; D. L. Cobb, Sloss Iron & Steel Co.; H. F. Frohman, S. Obermayer Co.; E. W. Smith, Crane Co.; C. J. Wolff, L. Wolff Mfg. Co.; C. E. Hoyt, Prof. P. M. Chamberlain, Lewis Institute, all of Chicago.

Major Malcolm McDowell read a paper on "The Value of Metalloids in Cast Iron." It will be found on another page. As introductory to his paper, Maj. McDowell said: "In order to render me what assistance is necessary, I wish you to take a copy of the paper and follow me until we come to the tables, to which I shall merely refer. The paper simply as a paper to be read and listened to has but little significance, except as reference to these tables, for the tables show the entire drift of the value of the metalloids. So if you want to get the correct idea you will want to study the tables as we come to them. It is one of the most intensely interesting subjects to me, and if I harp upon the subject it is because I want to impress upon you its value to a foundryman. It is one of the most important things that we have to discuss. There are a great many papers on a great many subjects that are exceedingly interesting, but nothing is so essential to the foundryman to know as what he is handling. If you have a correct knowledge of the metalloids used in making castings, you will know how to make them. This question is something that we cannot get through with in an evening like this. I am exceedingly anxious to have every foundryman who has had practical experience to take that part which he is the most familiar with and investigate it thoroughly and make something of it. We must come here and contribute something of our own personal experience. This matter of one man reading a paper on this and another man reading a paper on that and these papers being enjoyed and then dropped, is not right. We men want something in return. I want your thoughts and ideas on the same subject. I expect a very generous criticism of my paper, and in that way we can get at something that is of value to us.

Discussion.

Mr. Ferguson: I believe you will all agree with me that this is one of the most valuable papers that has ever been presented to this association, and I regret that the proof sheets were not gotten out earlier so that every one could have had a copy before coming here to-night. It is a paper that will take study to create any amount of discussion. I hope that the members will enter into the discussion as thoroughly as they can under the circumstances.

Mr. Sorge: I would like to ask Maj. McDowell what he means in table B under "Fluidity" the fourth and fifth items: "Edges rounded off; corners of ⅛ wasted—not full. Surface rough. ½ of the ⅛ and ¼ of ¼ wasted. Castings not run full."?

Maj. McDowell: I refer there to the two drawings showing fluidity. That means that it did not flow into it; all that ⅛ part was wasted there; that the metal was not fluid enough to flow further and make a casting as thin as that. In the first casting the edges and corners were full and sharp and of smooth surface similar to the soft casting. Test bars are things of personal property, I was going to say. The Foundrymen's Associations never established any series of test bars for their own purpose and each man has a test bar for his own purpose. I have gone over a variety of test bars. This answers its purpose so far as I am concerned. There is a series of test bars that will give you the entire history of any casting you make. If you make these different tests you will know just exactly what made that peculiar sort of a casting. There is a standard transverse and tensile strength; that is the chill block, an indispensable thing in every foundry.

Mr. Ferguson: You say: "It is one thing to make a high grade strong casting, having a tensile strength of from 35,000 pounds to 40,000 pounds per square inch, and quite another thing to make a water pipe out of the same metal. It is possible to make a cast iron water pipe that will carry over 30,000 lbs. tensile strength per square inch, but the combination of metalloids would be different in each kind of casting." Now I do not quite understand that. To my idea it is possible to produce a water pipe of any given thickness that will show a transverse strength of 30,000 lbs. on an inch bar. It seems to me that it is altogether due to the handling of the metalloids in due proportion. And if we cannot do this it seems to me it is a lack of knowledge of the proportions of the metalloids needed to produce the desired strength of the bar.

Maj. McDowell: I never had experience in making water pipes and I went to a large concern under a contract to make water pipes that would stand a high tensile strength and I saw it was a very different thing than to make other things. I could not make a water pipe in the same way as I had made other castings. I had to ascertain what that was. After a series of heats I got what was wanted to make a strong iron. I had to get at the value of the metalloids that made the pipe. There are limitations in making castings in a cupola for certain purposes and when persons speak of doing wonderful things with a cupola it always strikes me as though they did not know what they were talking about, for a cupola has its limitations. We only get out of it what we put in, with some slight losses or additions. When you think that a very small percentage of a certain ingredient will make such a change it is wonderful. If you will look at the table of these three heats, you will notice that No. 1 is 1.92 silicon; .80 phosphorus; .081 sulphur and .43 manganese. We made a pipe that was sufficiently strong, but not up to contract. We were very much pleased with it. In the next lot we made a stronger material but the heads pulled off and we did not make a pipe. But in the experience of the two heats we arrived at what we wanted and you will find in the last heat what did it. There are three different heats and the slight variation, if you will notice, is simply this: that the manganese is increased and the sulphur reduced and the silicon very much lower in this case than in either of the others. We got strength by low silicon and did not have sulphur to contend with.

Mr. Ferguson: I think the initial point in this paper and the point that ought to be studied is the one about the value of metalloids, and becoming acquainted with them. The per cent of iron in the original pig is 93.37, leaving 6.63 per cent of metalloids to work with in making castings. To my mind that is an important fact—that that slight percentage is the governing element in all grades of cast iron from the hardest to the softest, from the weakest to the strongest. And the thought comes to me what a delicate thing it is, and how we went along for years accomplishing what we have without the knowledge needed for the handling of these things.

Maj. McDowell: If you will look at the next table, B, and take the first heat of 49,000 lbs. Look it all through. What is it that produced that? Then look at the others. See the slight variation. I have made up a table on the value of wrought iron, iron castings, steel castings and four or five different grades, of their market value, tensile strength and chemical constituents. Look at the differences in iron, some selling for $45 a ton and others at $25. We deal with such small amounts in such large things. When I think of it I am perfectly astonished what foundrymen know and do not know; how they know it and sometimes wish they did know. What we want to do to-day is to get to the point at which we do know how we do it. It is merely a question of metalloids combined with iron. We talk over the dollar and cent question as if that was the all-important thing, when we have to deal with ideas and principles. They have more value than dollars; without them dollars would not do much. The idea is crystallized in the mind of the draftsman and then the pattern maker gives the form to it, and the molder makes it and the furnaceman casts it and that is the foundation for some

great structure, and this small matter of metalloids either makes or mars the entire thing. It is possible for a person with a correct knowledge of metalloids to work from an absolute standpoint to a certain thing. I do not hesitate to go into a foundry and make a thing desired and I will guarantee that it will be right. There was a time that I could not do this. What we want to do is to arrive at the point where we will make what we start out to make. The time is coming when iron will be handled more intelligently than it is to-day and it will be far more satisfactory to both buyer and seller. Just as soon as it comes to the knowledge of the furnaceman that he is selling iron that is worth a great deal more than he is getting for it, he will quit it. And when he does that, the foundryman will buy the iron he wants for a certain piece of work.

Mr. Sorge: In the paragraph that our chairman cited you seem to make a positive statement that "The per cent of iron in the original pig metal is 93.37, leaving 6.63 per cent of metalloids to work with in making castings." Did you not really mean that in some iron you find that percentage? Does not that percentage vary in the various irons?

Maj. McDowell: There is no question about that. I was very positive only about that one pig.

Mr. Smith: The value of metalloids is a matter of great moment to foundrymen. The great question has always been how to obtain the knowledge. We have not had the advantage of a college education nor of a chemical education, we simply have to pick it up from books and other writings on the subject. Encyclopedias really give us no knowledge; neither are there any works that take up the entire subject. I believe there is more in this paper of Maj. McDowell's than anything I have ever run across. The only way that we can obtain that knowledge is by discussion and I would like to ask one or two questions. There are several statements made in regard to carbon. In one place he says: "While the second heat was drawn earlier, and therefore it is claimed had more carbon." "It was not for the lack of carbon but for the want of silicon." A little later on, near the bottom of that column we read: "In the subsequent heat No. 5, it fell to .10 and in No. 6 to .09¾ inch, the carbon remaining the same, but the silicon going down, showing it is want of silicon and not carbon that reduces the elasticity of iron." I would like to ask Maj. McDowell if he considers, as I have read it in the past, that carbon gives the iron its structure and the other metalloids control that structure. What effect do the other metalloids have upon the carbon?

Maj. McDowell: A casting depends upon the amount of carbon and its relation to the iron. Silicon does not combine, and manganese combines the carbon. Manganese when put into the cupola intensifies the iron's affinity for carbon. When you have those two metalloids occupying such a relation to each other as to effect the casting you are going to make, so that ⅔ will be combined and ⅓ graphitic, you have one kind of iron. In table B in the first heat you will see silicon 1.34, manganese 1 00. Now as far as I know those two elements worked in harmony just to the point of giving the strongest metal we could get. I made quite a large number of heats where it runs up to 49,000. I have a list of heats at home where it averages 42,000 lbs. tensile strength. The object is to get these two metalloids so that the carbon's relation to the iron is such that a certain amount of carbon is combined and a certain amount becomes graphitic—⅓ combined and ⅔ graphitic is a fine iron.

Mr. Ferguson: The Major's statement about manganese assisting in the combination of carbon is at variance with my experience. I will cite you two analyses with hard iron: The first is: Silicon, .40; manganese, .33; sulphur, .09; combined carbon, 1.10. The second: Silicon, .44; manganese, .40; sulphur, .07; combined carbon, .83.

Maj. McDowell: I do not understand where the silicon and manganese were in the two heats.

Mr. Ferguson: The manganese was put in the ladle.

Maj. McDowell: There is a difference between manganese in the ladle and manganese in the cupola. Manganese at a certain point will make graphitic carbon and manganese at another point will make combined carbon.

Mr. Ferguson: We put the manganese in the ladle as we could control it better. I carried on a line of experiments raising the manganese until it reached 1.38 and up to that time we found it a softener; it reduced the combined carbon. Beyond that point it became a hardener.

Maj. McDowell: When you put manganese into a cupola its action is very different from what occurs when it is placed in the ladle. You will find that silicon does not make itself manifest until it is at a certain point. What we want to find out is, what is that point?

Mr. Ferguson: The point I make is that I think you should modify the statement that manganese produces combined carbon. It does not up to 1.38. What would you think of an analysis of this kind: Silicon, 1.40; manganese, 1.26, and sulphur, .08, or lower than that, .04, and combined carbon, .60?

Maj. McDowell: I never figure on combined carbon alone, I figure on the total amount of carbon. You could give me any number of heats that would puzzle me. I have been very much deceived in putting manganese in the ladle. I would like to say that you will all give me a fair chance to answer questions if you will write them and send them to Mr. Sorge and I will make a study of them in advance of next meeting.

Mr. Ott: I would like to ask Maj. McDowell if he has ever run more than one test bar out of the same ladle?

Maj. McDowell: We always make four test bars. We take an average of the four.

Mr. Ott: Can you explain the difference in the four bars?

Maj. McDowell: I cannot. A test bar is simply a guide. I make test bars for transverse strength and I make chill blocks. We made some test bars four feet long and we found differences in the same bar. Then we made a cylinder and cut out from the cylinder a square chunk. That is the Government's way of doing it, because they use the iron for shells.

Mr. McPharren: I made a few notes on the train coming down but I did not understand the scope of the paper. The discussion of the influence of metalloids brings up the old controversy between those in favor of physical tests only and those who prefer chemical analysis. In this controversy one point has never been clearly enough defined. That is: What is meant by a chemical analysis. The average man gets the silicon and sulphur determined on a sample of pig iron; then, calling that an analysis, he makes up his mixture accordingly. He entirely overlooks the fact that silicon and sulphur are but two of perhaps 10 to 20 elements. Carbon, phosphorus, silicon, sulphur, manganese, copper, chromium, tungsten, titanum, nanadium, nickel, cobalt, aluminum, potassium, sodium, magnesium, calcium, lithium, oxygen, nitrogen, hydrogen, and carbon-monoxide have all been found more or less frequently and in varying quantities. The last five probably occur in the inclosed slag. Most of these are of rare occurrence. Even when present in small amounts, some, as titanium, and tungsten, exert a powerful influence. The presence of nitrogen is held by some to account for the inferiority of Bessemer to crucible steel. Nor are our troubles over when we have present but carbon, silicon, sulphur, phosphorus and manganese. Carbon is found in steel in three or four conditions, depending on the amount of carbon present and the previous treatment of the material. Phosphorus is known to exist in two conditions, one producing cold shortness, the other but little effect. I run over these items hastily and do so merely to show why it is that so many things happen that we cannot explain by the ordinary chemical analysis. There is no reason why two irons of exactly the same composition should not be alike. There is a reason for every difference. The chemistry of iron and steel has by no means attained perfection, but our knowledge of the subject is growing each year. The tensile strength of rolled open hearth steel plates can even now be calculated to within a few thousand pounds, and I believe the time will come when the strength, hardness and other properties of iron can be closely calculated from the chemical analysis.

Mr. Carver: As I stated to a few gentlemen before the opening of the meeting, this is by far too important a paper to let it drop as it is. As we have so few of our members present I want to hear this paper read at a future meeting and I think with the combined efforts of the individual members and the officers, the presence of at least 200 foundrymen can be obtained. I move that the further discussion of this paper at the present time be dispensed with and to make it a special order of business that there be further discussion of this paper at the next meeting of the Western Foundrymen's Association. This motion was unanimously carried.

On motion, a vote of thanks was tendered Maj. McDowell for his able paper and his presence at the meeting. The meeting then adjourned.

VALUE OF METALLOIDS IN CAST IRON.*

BY MAJ. MALCOLM M'DOWELL.

On July 12, 1896, I read before the Western Foundrymen's Association a paper on the practical value of the various metalloids in cast iron, in which I outlined a series of experiments to demonstrate the influence that silicon, phosphorus, sulphur, and manganese exert when combined with iron in various proportions, and then a combination of the different metalloids in various proportions with iron to ascertain not only the individual value of each, but what combination of metalloids with iron will give the best metal for all the various uses a foundryman is called upon to make. Whether metal is graded and sold by fracture or by chemical analysis, its value is determined by its constituent elements, so that the experiments proposed are of equal value to the furnace as to the foundryman.

The Western Foundrymen's Association appointed a committee of three to carry out my suggestions, but on account of the depressed condition of business during the year, nothing definite has been done by them. I desire, therefore, to present for your consideration further ideas on the same subject, showing the value of even a limited knowledge of the various metalloids that combine with iron in making high grade castings, and by varying their proportions show their influence in different physical tests.

Pursuing a similar course to ascertain what brand or brands of pig iron will give the best result in making castings as that I propose in ascertaining the value of the various metalloids that combine with iron, and after establishing a known basis in practical work I analyze both the pig metal and the castings it makes, and then identify this analysis of pig iron by fracture of the same, to establish a gradation of metal by fracture. This can be done, and holds good, so long as that special lot of iron lasts, but is liable to be vastly different when a new lot of metal is bought; for independent of the constituent elements that affect the fracture, the temperature at which a cast of pig iron is made, and the length of time it has to cool, will influence the nature of the fracture. The fracture of a *sow*, *hot* and *cold* end of a *pig*, will show a difference in the structure of the fracture that would cause a grader in grading by fracture to give the same metal three different numbers, when each practically analyzes the same. It is not an unusual thing for a furnace which grades by fracture to sell to a foundryman a No 4 foundry pig, when upon analysis, the foundryman finds it equal to No. 2 foundry. It would be more profitable for a furnace to sell, and quite as satisfactory for a foundry to buy, by chemical analysis.

A combination of metalloids with iron that will make a good dry sand roll, pinion or gear wheel, would not do for stove plate, wagon skein, or cast iron water pipe. It is one thing to make a high grade, strong casting, having a tensile strength of from 35,000 lbs. to 40,000 lbs. per square inch, and quite another to make a water pipe out of the same metal. It is possible to make a cast iron water pipe that will carry over 30,000 lbs. tensile strength per square inch, but the combination of metalloids would be different in each kind of casting.

To illustrate the following tables of three heats: The first two were preliminary heats made to test the practical value of different brands of pig iron, and were made according to what the fracture would indicate from their constituent elements, and the third heat was made after the experience had in testing the physical properties of the other two heats, and then having the pig iron out of which they were made, as well as the casting they produced, analyzed. This information enabled me to make the third heat intelligently from selections of pigs whose chemical constituents were known.

	Silicon.	Phosphorus.	Sulphur.	Manganese.	Deflection in 1" sq. bar, 24" between centers.	Trans. str. in 1" sq. bar, 24" between centers.	Tensile str. of 1" sq. bar.	
Heat No. 1.	1.92	.80	.081	.43	.40	1,475	26,000	Good Pipe.
Heat No. 2.	1.40	.57	.082	.54	.35	1,465	29,000	Heads Off.
Heat No. 3.	1.68	.50	.025	.75	.44	1,500	31,000	Good Pipe.

The first heat was too rich in all the metalloids to make a very strong casting, but it made good pipe; while the second was too high in sulphur, and too low in silicon to make a cast iron pipe, for although the casting was strong it did not come up to the requirements. Out of the experience had in the previous heats, both in physical and chemical analysis, the third heat was evolved, which metal met all the requirements, in quality of pipe, and strength of metal.

Blast furnaces have regular grades of iron, running from No. 1 to No. 6, varying this in some cases by adding an "X" or a "P" as No. 2X or No. 2 Plain, and substituting names instead of numbers, as gray, mottled and white forge, and calling some grades No. 1, 2 or 3 soft. Most furnaces, all but a very few, in fact, grade their product entirely by fracture, and as a consequence what is No. 1 in fracture from one furnace is not like No. 1 from another furnace. A few furnaces grade by chemical analysis, but they are very few, and even these, to satisfy the requirements of many of their customers, have to make part of their grading by fracture. And still the commercial value of pig iron depends entirely on its chemical analysis.

While I do not claim that the following table is accurate and up to date, it is sufficiently so for me to make plain what I wish to illustrate.

		Price per ton.	Total Carbon.	Sil con.	Phos phorus.	Sul- phur.	Manga- nese.
No 1.	Foundry.	$12.00	3.68	2.90	.75	.01	.30
No. 2.	"	11.50	3.30	2.25	.70	.02	.40
No. 3.	"	11.00	3.25	1.50	.30	.03	.50
No. 4.	Gray Forge.	10.50	3.80	1.00	.65	.04	.62
No. 5.	Mottled "	10.00	3.75	.70	.50	.05	.75
No. 6.	White "	9.50	3.65	.40	.35	.10	.96

A practical foundryman looking over this table will readily pick out the two columns that give value to pig iron in his work, those of silicon and sulphur. The money column shows a difference between $9.50 and $12 of $2.50, while the silicon column shows a difference of 2.50 per cent in silicon, making each one-tenth of one per cent silicon worth ten cents.

It is estimated that each atom of sulphur neutralizes ten of silicon. When pig iron carries three or more per cent silicon, it is called a "softener"; when it goes between three and five per cent, it has various names, such as "silvery"; and after it goes above five per cent, and from that to ten, it is called "ferro-silicon." This carries less sulphur in proportion to its silicon than any other form of pig metal, and as a softener is a question of silicon, 10 per cent "ferro-silicon" is the cheapest softener that can be bought.

While pig iron, softener and ferro-silicon prices are all measured by the amount of silicon the metal carries, high silicon iron alone will not make a good casting. It requires a proportionate amount of manganese to insure castings that are strong, solid and free from sponginess. A foundryman should keep on hand at least one car load of 10 per cent ferro-silicon and one ton of 80 per cent ferro-manganese. Equipped with these two and a coke that will run less than .75 per cent sulphur, he can meet any requirements in castings, even if he has nothing but common cast scrap iron to work with, or an off pig, provided he has an intelligent knowledge of the use of these two metalloids.

When all other things are equal in pig iron, the variation in silicon will be manifest in the fracture, provided it is made and cast at the same temperature. Each of the three metalloids, phosphorus, sulphur and manganese, varying in their proportions, also affect the nature of the fracture, as do also the different degrees of temperature at which the metal may be cast, and the condition of the atmosphere at the time of casting. These are the causes that make it impossible to make a uniform gradation of pig iron by fracture.

All blast furnaces making metal for steel works meet the requirements of the steel maker by furnishing a metal having a specific analysis, while a few exceptional blast furnaces making a foundry metal, grade their output by fracture. They do not care to employ a chemist to grade it systematically according to its constituent elements by analysis. There are a great many foundries that employ to a greater or less extent a chemist to analyze the pig iron they buy and castings they make, and in buying metal graded by the furnacemen according to fracture, they have been enabled by the use of

* Read before the Western Foundrymen's Association, Chicago, January 19, 1898.

chemistry, to duplicate their orders very much to their profit and the furnacemen's loss. In justice to both furnace and foundryman, pig iron should be bought and sold by analysis. One of the most important things to be accomplished by the united efforts of the various foundrymen's associations is to establish a gradation of pig iron based upon chemical analyses so that the metal can be bought and sold on its merits as exhibited by its constituent elements.

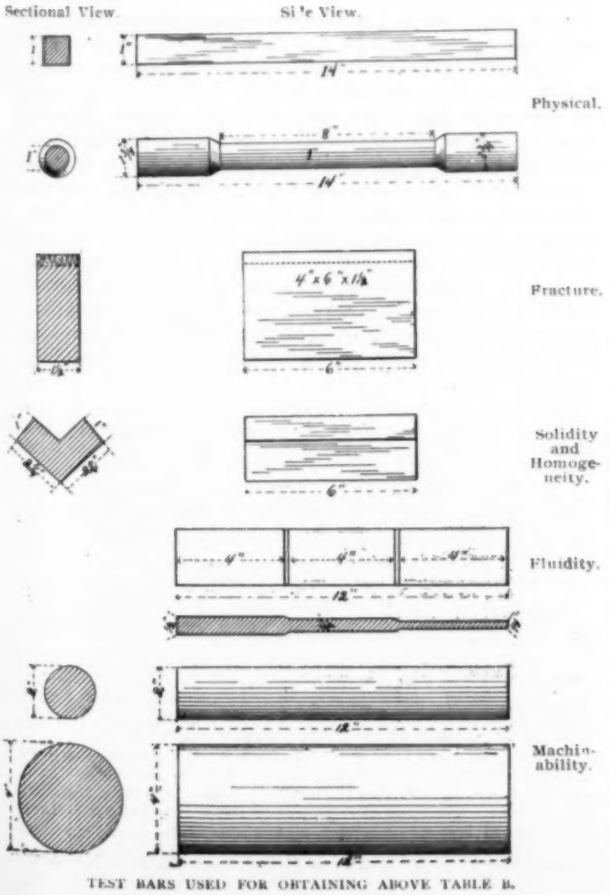
In melting iron in the cupola a loss from four to 10 per cent is sustained. Almost all of the loss of metal is in the metalic iron, but a portion comes from the various metalloids contained in the original pig metal.

The per cent of iron in the original pig metal is 93.37, leaving 6.63 per cent of metalloids to work with in making castings. The iron in the finished casting is 93.60 per cent, leaving 6.40 per cent of the metalloids, making .23 per cent that is eliminated. It is hard to realize that such a small percentage is what we have to do with in making various grades of castings.

In the Methodist Church, of which I am a member, much is made of personal experience, and when a good brother gets tangled up on some questions of theology, his way out is to fall back on his personal experience. Now, if I were to undertake to make a scientific explanation of all the whys and wherefores, I would soon find myself in the condition of my pious brother, and, therefore, ask your indulgence in giving you my personal experience in the use of a limited knowledge of the value of the metalloids that combine with iron in making castings from a cupola melted metal. One who undertakes to make new improvements makes many failures; and if out of the many efforts one success comes, he is justly proud of it. If I manifest some pride in the following report, you, who like me, have had your share of failure, will congratulate me on this one success.

TABLE B.

Number of heat.	Metalloids. Combined carbon.	Uncombined carbon.	Total carbon.	Silicon.	Phosphorus.	Manganese.	Sulphur.	Physical. Transverse 12" centers. 1" square.	Tensile 1" area.	Deflection 12" centers.	Contraction of bar.	Depth of chill, 1½"x 4" x 6" block.	Fracture.	Solidity and Homogeneity.	Fluidity.	Machinability.
1	.93	2.19	3.12	1.34	.08	1.00	.003	4300	49000	.14	.....	¾in.	¾-in. chill, ⅜-in. mottled, 2½ in. gray, fine, homogeneous casting.	.....	.....	Tough, solid, with a hard surface, but machined easily.
2	.70	2.60	3.30	2.00	.64	.80	.035	2400	28000	.10	¾ in.	1-16 in.	Open in the center, uneven fracture, dark gray.	Segregation in the center; open grained fracture.	Edges and corners full and sharp; smooth surface.	Very soft and easily machined.
3	.75	2.54	3.29	1.92	.60	.79	.027	2700	30000	.10	⅜ in.	⅛ in.	Uniform fracture and dark gray.	Spongy, but a finer grained fracture.	Edges not sharp, but corners full; smooth surface.	Easily machined and fine finish.
4	.80	2.44	3.24	1.79	.57	.78	.029	3100	34000	.10¾	1 in.	¼ in.	Uniform fracture, but a bright gray.	A fine fracture, but spots of sponginess.	Edges and corners rounded off; surface tolerably smooth.	Not so freely machined, but finished finely.
5	.90	2.39	2.89	1.67	.55	.77	.032	3400	35000	.10	1⅛ in	⅜ in.	Fine, uniform fracture, but a bright gray.	A fine, homogeneous, uniform fracture.	Edges rounded off; corners of ⅛ wasted—not full. Surface rough.	10% more power to machine; fine finish.
6	1.00	2.25	3.25	1.58	.50	.76	.034	3500	36000	.09¾	1¼ in	⅝ in.	Very fine and uniform fracture; bright gray.	Very solid and homogeneous fracture.	½ of the ⅛, and ¼ of ¼ wasted. Castings not run full.	20% more power to machine in large castings.



TEST BARS USED FOR OBTAINING ABOVE TABLE B.

The following is the report of Maj. J. W. Rieley, Commandant, Watertown Arsenal, on some cupola metal made by me to demonstrate to the United States Ordnance Department that it was possible to make in a cupola a metal costing less, but superior to *gun metal* which they specified "should be charcoal pig melted in a hot air furnace," the tensile strength to be not less than 27,000 and not to exceed 38,000 pounds per square inch:

ORDNANCE DEPARTMENT, U. S. A.

REPORT OF MECHANICAL TESTS MADE WITH THE U. S. TESTING MACHINE, CAPACITY 800,000 POUNDS, AT WATERTOWN ARSENAL, MASS., DECEMBER 28TH, 1894.

Tests by Tension. Cupola steel for Malcolm McDowell, Chicago, Ill.

Nos. 5,170 and 5,171 had stems 2 inches long, turned down from 1 inch square cast bars.

Nos. 5,172 and 5,173 were turned down to grooved form of specimens from 1½ inch round cast bars.

Test No.	Diameter. inches.	Sectional. Area sq. inches	Sectional. Total pounds.	Pounds Sq. inch.	Appearance of Fracture.
5170	.564	.25	12.300	49.200	Fine Granular.
5171	.564	.25	11.460	45.840	" "
5172	1.129	1.00	46.400	46.400	" "
5173	1.129	1.00	42.820	42.820	" "

J. W. RIELEY,
Major Ordnance Dept., U. S. A., Commanding.

This metal was condemned at first by the Ordnance Department, because it went over 38,000 lbs. per square inch, tensile strength. It was claimed that when it did so, the metal was too "cold-short." This idea arose from Capt. Rodman's report, made away back in the fifties. Capt. Rodman, after selecting various brands of the best charcoal pig he could find, took three of them which he considered best, and then

after refining, which was done by remelting two or three times, he cast his metal into cannons. The preliminary heats made in his first test, showed over 38,000 lbs. tensile strength and the metal was hard and brittle. This was condemned on account of its cold-shortness; but test bars from subsequent heats, which were not subjected to so much heat, showed less than 36,000 lbs., and having more elasticity the metal was accepted. It was claimed the cause of the failure of the first heat was that it was too much de-carbonized in the furnace, while the second heat was drawn earlier, and, therefore, it is claimed had more carbon. It was not for a lack of carbon but for a want of silicon.

Table B represents six different heats. No. 1 of this table is the same as No. 5,170 of the Ordnance Department's Report, and it is placed here in this table to show what is possible in making a metal high in transverse and tensile strength with a large amount of elasticity, due to the lowness of phosphorus and sulphur, and which is easily machined. You will note that the percentage of nearly all of the metalloids is lower in this heat than in the others, while the heat is highest in transverse and tensile strength. This is due to the special proportions of silicon and manganese, as they are at the points where they exert their best influence on the carbon in combination with the iron, and the carbon being free from the influence of the phosphorus and sulphur in its combination with the iron, leaves the metal with more than usual amount of elasticity. It is these conditions that make the metal tough, not hard, in turning and machining.

Now follow the lines and columns of the other five heats. The carbon is very near the same in all, while there is a gradual decline in the other metalloids, excepting that of sulphur, which, in like proportion, increases; and the transverse and tensile strength, as the metalloids are reduced, increase, but the elasticity is reduced. The bar of No. 2 broke before it reached 3,000 lbs., and bar No. 3 broke at only a little higher, each registering 10 inch deflection. The only reliable figure in this column is at No. 4, which at over 3,000 lbs. registered 10¼ inch deflection. In the subsequent heat, No. 5, it fell to 10 and in No. 6 to 9¾ inch, the carbon remaining the same, but the silicon going down, showing it is a want of silicon and not carbon that reduces the elasticity of iron.

The next three columns are full of interest, as they show the depth of chill, the amount of shrinkage in a bar 8 ft. long, and the nature of the fracture. The last three columns have to do with questions of great importance:—What combination of metalloids will make a casting free from sponginess in the corner of a flanged casting? What will make a metal of sufficient fluidity for making special castings? How low can you run silicon in combination with the other metalloids to secure the greatest strength and solidity, and be easily machined?

Table B is a tabulated statement of my personal experience in making castings with the limited knowledge I have of the value of metalloids that combine with iron in castings made from metal melted in a cupola.

Iron and Steel Roofing Men Meet.

The National Iron and Steel Roofers' Association held its annual meeting at the Grand Hotel, Cincinnati, Jan. 19. Representatives were present from 16 of the 49 firms belonging to the association. The condition of business was discussed in detail, and the volume of sales was reported to be larger than in three or four years. A continuing large demand is generally expected, according to the statements of the manufacturers present at the meeting, and the expansion of business coupled with the upward tendency in raw materials, it was thought would undoubtedly result in higher prices in the spring. The lines represented by the association include metal ceilings and metal lathes, as well as iron roofing, and in these goods there is a growing export trade, England, South Africa, and South American countries now being consumers of American goods. The officers chosen for the ensuing year are as follows: President, G. E. Needham, Cleveland; vice-president, E. E. Souther, St. Louis; secretary and treasurer, George M. Verity, Cincinnati; executive committee, Alex. Glass, Wheeling; E. L. Langenbach, Canton, O.; J. G. Battelle, Piqua, O.; J. E. Annis, Chattanooga; A. L. Andrews, Cincinnati; H. C. Hornbrook, Cambridge, O.

COAL CAR UNLOADERS IN 1897.*

BY WM. B. HANLON.

Unfortunately the coal strike of the season of 1897 caused some of the lake car unloaders to be idle, and hence the good and bad qualities of some of the machines could not be observed. During the season the Lindsey machine on the C. C. & S. dock at Cleveland was abandoned and removed. The next machine described in my former paper, the Lond, is still in successful operation on the Erie dock, and is admitted by all designers of unloaders to be unequaled for rapidity and minimum cost of operation and maintenance. During the season of 1896 it unloaded 556,000 tons, and in 1897, 508,000 tons, the decrease being caused by the coal strike of that year.

The McMyler end dumps at Ashtabula and Fairport are still maintaining their record of satisfactory service. I have no late report of speed, but the former report gave 465 tons per minute. The McMyler side-dump on the Cuddy-Mullen dock at Cleveland has loaded in a very satisfactory manner about 500,000 tons during the season.

A machine of the same pattern has been built on the B. & O. dock during the season but with a bucket attachment on the end of the apron, instead of a spout. It has not given entire satisfaction, and on a duplicate machine built at Erie during the season, the bucket has been replaced by a telescope chute.

The latest design of the McMyler machine, for which contracts have been given for one at Conneaut and one at Lorain, provides for using the same cradle as in the former pattern, but instead of hoisting the cradle and car to the proper height to dump into the pan, the hinged side of the cradle is stationary and the overturning movement is the same as before, but the car empties into a large pan 40 feet in length, with a capacity of 40 tons. This pan has one sloping side and ends and concentrates the coal towards a door in the center of the opposite side from the car. When the pan is in a position for being loaded it is a quarter turned and the sloping side serves as an apron on which the coal passes from the car. As the pan fills the opposite side is lowered until it is in a vertical position, allowing the entire contents of the car to be discharged. The cradle is then turned back and the pan is hoisted by four cables to the necessary height to discharge into a telescope chute. By this plan a saving of about 38 to 40 tons of weight to be hoisted is made and the cars can be shifted while the pan is being emptied, thus saving time and power.

The five Brown machines have been in successful operation during the season and at the Hocking Valley dock in Toledo the record has been made of 4,700 tons in 12 hours, 200 tons of which was fuel and handled with one bucket. Another record is given of 337 tons per hour. The guarantee on these machines was for 300 tons per hours. During the season the Thornburg machine built by the Webster, Camp & Lane Machine Co., of Akron, O., has been put in operation at Sandusky and has loaded all the coal reaching that port by the C., S. & H. Ry. It is a side-dumping machine, taking the car from the dock level and elevating it and dumping on to a pan, thence by a spout to the boat. This firm now has the contract for building a machine on the Buffalo dock of the Buffalo, Rochester & Pittsburg R. R., which introduces some new features.

The cradle is the same pattern as the McMyler, but instead of using a pan, two large drop bottom buckets of 23 tons capacity each are used and each receives a portion of the load dumped. The bottom of the buckets is so arranged that when ready to fill the bottom is near the top and as the coal enters upon it, it descends to the bottom, thus not giving any fall to the coal. The buckets are conveyed from that position to the boat by an overhead crane. This firm is introducing into the Northwest a device for unloading from the vessels to stock piles in which the speed of unloading and breakage are very much reduced. It is a bucket of the clam-shell pattern so arranged that when open to receive its load it has an opening of 12 feet and a capacity of two tons.

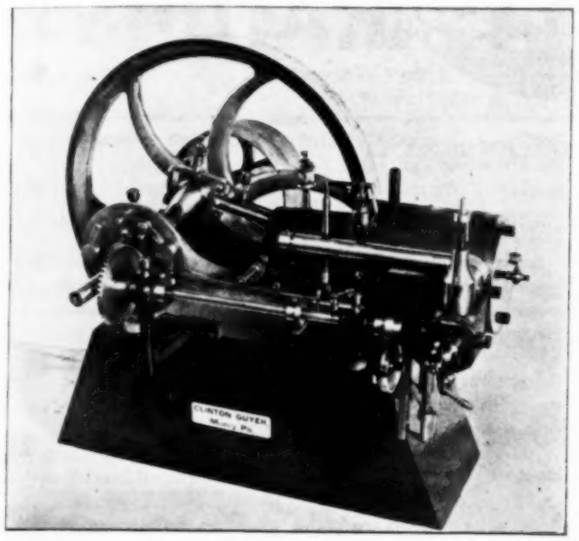
It is a debated question whether the condition of the coal when it reaches the Northwest is much taken into account, and it is rather the rule for vessel owners to seek the port where they can be loaded with the least delay, regardless of a slight percentage of breakage by the different machines.

During the season of 1897 perhaps 80 per cent of the lake coal was loaded after Oct. 1; and without the use of the rapid car unloaders the amount shipped could not have been handled by the lake. By June 1, 1898, every Lake Erie port will have from one to four unloaders.

* Read before the Ohio Institute of Mining Engineers at Columbus, O., Jan. 19-21, 1898.

THE GUYER GASOLINE ENGINE.

The illustration herewith is of an improved gas and gasoline engine of recent design, patented by Clinton Guyer, of Muncy, Pa. The maker has adopted the four cycle system, which has proved economical in operation for gasoline engines, but at the same time he has avoided the complication of mechanism heretofore thought necessary for the operatian of this class of engines. The tank containing the gasoline is placed outside the building and the gasoline is used from the tank in small quantities as required for actual work. The engine is arranged to use the electric igniter, the latter being constructed on an improved principal. All details are ar-



ranged with a view to safety. A sensitive governor is employed which maintains close regulation. The engine has large valve openings, ample bearings, straight line connections and embodies improvements suggested by years of use of gas and gasoline engines of various kinds. It is made in three forms—horizontal, vertical and a pattern for carriages or road wagons. It is also adapted to launches and pleasure boats. The engine has been well tested in the study and experiment of four years. It is now running the Guyer works at Muncy, and the expense of power is stated to be ¾ cent per hour per horse power.

The New York & Staten Island Electric Co., in February, 1897, contracted for the installation of about 1,200 h. p. Cahall-Babcock & Wilcox type of boilers in its power station, which then contained some boilers made by the Babcock & Wilcox Co., of New York. The company shortly doubled this order and now (just about a year later) has given the Cahall sales department not only a third order but also a contract to dismantle the boilers in its power station made by the Babcock & Wilcox Co., and rebuild them in the Cahall-Babcock & Wilcox type.

The Japanese cruiser Kasagi was launched last week at the Cramps' shipyard in Philadelphia. The Kasagi is a protected twin-screw cruiser with a contract speed of 22½ knots. Her dimensions are as follows: Length on water line, 374 ft. 6 ins.; beam, 28 ft. 9 ins.; depth, 30 ft. 6 ins.; draft, 17 ft. 9 ins.; displacement, 4,900 tons. She is built of mild steel and is provided with two 4-cylinder triple expansion engines, of a maximum I. h. p. of about 17,000. Her armament will consist of two 8-in. breech loading rifles, 10 4.7-in. rapid fire guns, 12 12-pdr. rapid-fire guns and six Hotchkiss rapid-fire guns. The Kasagi is the first foreign warship launched in this country since 1878.

All the personal property of the Valentine Iron Co. was today purchased at sheriff's sale by C. H. Bower for the preferred creditors at a sum slightly in excess of $10,000. The real estate of the company will be sold in April.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Kinnear Calk Co. of Columbus, O., has been incorporated by William R. Kinnear, Clarence E. Turner, Raymond H. Kinnear, Herbert D. Bennett, Frederick W. Prentiss and Howard C. Park. They will make horse shoes and shoe calks. The capital is stated to be $100,000.

An electric lighting plant will be installed in the Western Pennsylvania penitentiary, Allegheny. D. B. Oliver is chairman of the Board of Prison Inspectors.

The Brass Foundry & Machine Co., Jersey City, N. J., has been incorporated by Adolph Zimm, W. S. Laporte, Michael Gagin and others.

The Michigan Foundry Co., Detroit, Mich., has been incorporated with $15,000 capital, by Frank Zanoth, John Rutkowski and others.

In connection with the annual letting of cast iron water pipe by the city of Cleveland, Feb. 1, it is stated that there will be larger purchases than usual of riveted steel pipe, in place of some of the large cast iron pipe bought in other years.

New Construction:—

The Illinois Steel Co. will build a slab mill to cost $400,000 at its South works, commencing construction immediately. Plans for the mill have been prepared for a long time, but until now the directors of the company have hardly felt it wise to put in the mill. This will increase the number of employees at the South works by several hundred.

A Norristown, Pa., dispatch says that Mr. Potter, formerly a member of the firm of Howard & Bullough, of Pawtucket, R. I., has purchased 125 acres of land on Ivory Rock, that county, and intends building a large plant for the construction of textile machinery.

W. J. Adams will erect at Joliet, Ill., a three-story brick factory, 66x120 ft., for the manufacture of wire fence and a general line of iron work.

The Illinois Steel Co. has commenced the construction of a one-story foundry at its South works, Chicago, on 89th st., east of the Strand. It will extend over an area of 55 x 110 feet, and will be constructed of brick and stone. It will cost $10,000.

Press reports state that the Michigan Sugar Co., Bay City, Mich., closed a contract with the International Engineering Co., of Chicago, to erect the buildings and furnish the machinery for a plant in Bay City. The main building will be 100x270 ft., of brick, and running from three to four stories. There will be four beet sheds, 30x30 ft., and one story high.

At Waltham, Mass., Davis & Farnum, builders of gas plants, iron foundries, etc., will rebuild their foundry, which was recently destroyed by fire; estimated cost, $18,000.

Additions, Enlargements, Removals, Etc.:—

S. S. Beman has designed for the Gates Iron Works, Chicago, a large addition to its plant for the manufacture of mining machinery. The building will be located at 646 to 650 Elston ave. and will extend over an area of 79 x 366 feet. It is to be constructed of brick and stone and will cost $25,000.

At Brunswick, Me., it is stated that the Brunswick Construction Co. is contemplating the erection of an additional foundry.

The Dayton (O.) Foundry & Furnace Co. will remove its plant to Springfield, O. and will be reorganized under the name of the Springfield (O.) Furnace & Stove Co. The officers are: President, S. W. Martin; vice-president and treasurer, T. D. Wallace; secretary, I. F. McNally; second vice-president, J. F. Carpenter.

The Keasby & Mattison Co., according to reports, is preparing to enlarge its works at Ambler, Pa.

The Donaldson Iron Co., manufacturers of iron pipe for water and gas and special castings, says that it has not yet decided to extend its foundry plant as reported. Plans have been made wth a view of doing so in the future, if trade and circumstances warrant.

The Waltham (Mass.) Screw Co., will enlarge its plant.

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Fires and Accidents:—

The plant of B. F. Avery & Sons, Louisville, Ky., was damaged by fire Jan. 13, the loss on buildings and contents being from $50,000 to $75,000, fully insured. The fire will cause no delay in filling orders.

The Eclipse foundry, Cleveland, owned by Thomas, Joseph and Andrew McBeth, and Chas. Kelly, and making a specialty of architectural castings, was badly damaged by fire Jan. 23. The plant was practically destroyed, though the walls are intact.

General Industrial Notes:—

The East Chicago, Ind., merchant mill of the Inland Iron & Forge Co., Marquette Bldg., Chicago, started up Jan. 10, and is now running full in all departments. This plant was formerly owned by the East Chicago Iron & Steel Co. The Inland Iron & Forge Co. reports a good tonnage of orders closed, and excellent prospects for the future, judging from the number of inquiries being received all the time.

The Pittsburg & Lake Erie Railroad Co. has bought several acres of land at Glassport, Pa , from the United States Glass Co. The report that it was the intention of the railroad company to build roundhouses and car shops is denied by the officials, who say that the land was bought so that the company might establish a yard at Glassport to bring coal from mines between McKeesport and Fayette City.

The South Cleveland Foundry Co., South Cleveland, O., has made an assignment to F. C. Friend. The assets are placed at $9,000, while the liabilities are $6,000.

The Eureka Cast Steel Co.'s plant in Chester, Pa., which has been in the hands of a receiver over a year, has been ordered by the court to be sold by the sheriff. The decree ordering the sale provides that the property must bring at least $21,000, the amount of the first mortgage, otherwise the sale will be set aside.

August Becker, 36 Oliver st., Boston, Mass., has just completed a thoroughly equipped plant for the manufacture of machine screws and will conduct this business under the name of Boston Machine Screw Co. Mr. Becker for a number of years has manufactured name plates for machinery, engines, dynamos, etc., and this part of the business will be continued as heretofore.

Hickman, Williams & Co., pig iron commission merchants, of Louisville, Ky., will establish a branch house in Chicago under the management of H. L. Williams, whose office will be located in The Rookery. They are agents for Southern iron manufacturers.

In December, at the rod mill of the Consolidated Steel & Wire Co., at Beaver Falls, Pa., there was turned out 7,811½ tons of rods on a single mill.

The finishing department of the plant of the Lockhart Iron & Steel Co., at McKee's Rocks, Pa., which has been idle for some time, was started up last week.

It is rumored that the Wilkes Rolling Mill, at Sharon, P a., will be started up again at an early date. The plant was built in 1891 for the manufacture of muck bar but has been idle for some time.

At a recent meeting of the Ellis & Lessig Steel & Iron Co., Pottstown, Pa., the stockholders decided to erect an open-hearth steel plant and universal mill, to adjoin their nail works. Estimates are now being received and orders for machinery and buildings will be placed immediately after the plans are adopted.

Some excellent records have been made at the basic open-hearth steel plant of the Shoenberger Steel Co., Pittsburg, of which G. L. Luetscher is superintendent. Furnace No. 1 recently made 250 heats and No. 2 made 253 heats before the gas was shut off from either furnace to make repairs, the output being a little over 15,000 tons. The furnaces are run on producer gas and each made 15 heats per week, the phosphorus being very low, showing an average of 0.008.

At Muskegon, Mich., attachments for $4,700 have been levied against the assets of the Consolidated Steel Rail Joint Co. by employes and merchants who hold the company's time orders. An effort is being made to reorganize under the name of the Michigan Iron & Steel Co. The company has been operating the Muskegon rolling mill, making bar iron.

At Indianapolis, Ind., the sale of the Premier Steel Works has been postponed until Saturday, April 9. The postponement was requested in the hope of disposing of some entangling litigation in the meantime.

North Lebanon (Pa.) Furnace, No. 1 is about to be blown in after an idleness of 18 months.

The Eleanor Iron Co., with works at Hollidaysburg, Pa., and offices at Tyrone, Pa., manufacturer of muck iron, merchant iron and skelp, has discontinued business and surrendered the mill to the bondholders. Low prices for bar iron and the other products of the plant compelled the company to pursue this course.

The Pullman Palace Car Co. has declared its regular quarterly dividend of $2 per share, payable Feb. 15 to stockholders of record Feb. 1.

The Consolidated Steel & Wire Co. has declared a quarterly dividend of 2½ per cent, payable Feb. 1 to stockholders of record Jan. 19.

A deed filed at Uniontown, Pa., last week, completes the deal referred to in these columns some time ago by which the interests of H. C. Frick and the Illinois Steel Co. in the Southwest Connellsville Coke Co. were separated. Certain lands are conveyed to H. C. Frick in exchange for 15 per cent of the stock of the coke company. The value involved is $750,000 and the tract transferred comprises 1,250 acres of coal and 219.9 acres surface, including a railway right of way. The land lies in South Union and Georges townships. Most of this land was purchased by the Southwest Coke Co. from the Revere Coke Company in 1892. At a meeting of the Southwest Connellsville Coke Co., held at the Morewood office, in Mt. Pleasantast, week, the resignations of H. C. Frick as president and S. W. Haskell as secretary were tendered and accepted. The following were then chosen as officers of the company: Charles H. Foote, president; William P. Palmer, vice-president; Charles Hazler, secretary and treasurer, all of Chicago; resident director, James H. Cowen, of Mt. Pleasant.

The Riter-Conley Co., of Pittsburg, has received an order from the Oxnard Construction Co., of New York, for two monster steel tanks to be erected for a Pacific coast oil company at Los Angeles, Cal. The tanks will be 85 feet in diam-

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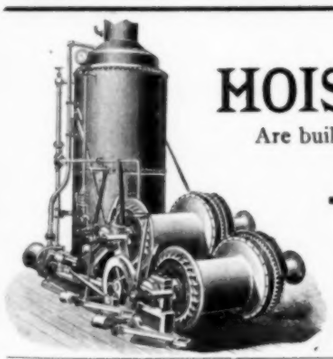

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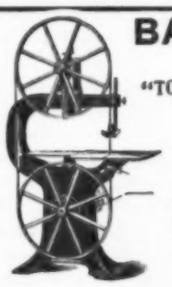

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eter and 35 feet high. Each will have a capacity of about 35,000 barrels of oil. They will cost about $50,000, and Pittsburg workmen have been sent West to begin the erection. The company will also construct there a steel smokestack 133 feet high, having a diameter of over 16 feet at the base and 12 feet at the top.

Pittsburg and Philadelphia capitalists, including John Pitcairn, John W. Chalfant, George A. Chalfant, James W. Friend and Albert S. Beymer, have formed the Pioneer Natural Gas Co., to supply gas in Armstrong, Allegheny, Beaver, Butler and Westmoreland counties, Pennsylvania.

The first in a course of free lectures to be given under the auspices of the Carnegie Library Association at the expense of Andrew Carnegie for the employes at the Edgar Thomson steel works and blast furnaces, was delivered last Thursday to 2,000 persons in Carnegie Music Hall, Braddock, by Prof. Morris Jastrow, of the University of Pennsylvania. His subject was "Some First Steps in Civilization."

Last week, in the rod mill of the Consolidated Wire Mills at Allenown, Pa., about 617,000 pounds of material was turned out in 24 hours. One turn made 1,600,000 pounds in five nights.

It is said that a syndicate of Philadelphia capitalists may take hold of the Philadelphia Bridge Works, at Pottstown, Pa., and operate them. An inspection was made of the plant last week.

The Cambridge Iron & Steel Co., of Cambridge, O., has in course of erection two new sheet mills and the additional annealing furnaces, etc., required to take care of its increasing trade. The building for the sheet mills is completed, and ground broken for the mills, and the company is hoping to have them in operation by April 1.

The Iron City Mfg. Co., manufacturers of steel ceilings, whose works are located at Pittsburg, has been purchased by John C. Graff, of the Graff Roofing Co., who will reorganize the business of the Graff Roofing Co. and Iron City Mfg. Co., under the charter of the latter concern, and the name of the Iron City Mfg. Co.

No. 2 Paxton furnace, at Harrisburg, will be put in blast about Feb. 1, and No. 1 will be prepared for starting.

The Payne Works, located at Elmira, N. Y., and which have been shut down for over a year, will be opened again. The plant, including the real estate, and machinery, was sold for $45,300. It is announced that the plant will be reopened by B. N. and B. W. Payne, who will act as representatives of Mrs. A. R. Payne, Helen A. Payne, and S. Kate Payne, the new owners. The Payne Engineering Co., of New York, who handle the Payne engines, has been having them built during

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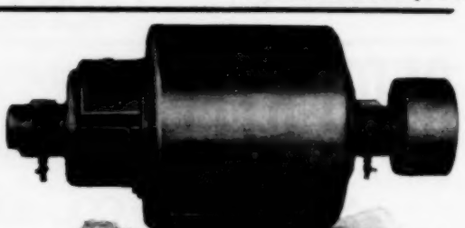

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the time the Payne works were closed by a firm in Newburgh, but the business will be brought back to Elmira.

The Toledo Foundry & Machine Co., Toledo, O., has designed and is now building a 50-ft. turntable for a railroad in Japan.

Car and locomotive work: The Michigan Central is building six six-wheel engines. The Seaboard Air Line has ordered seven from the Pittsburg Locomotive Works. Five eight-wheel passenger engines and six six-wheel switching engines have been ordered by the C. & N. W., from the Schenectady Works. The Mobile & Ohio has ordered 10 locomotives from the Rogers Locomotive Co. The P. & W. is in the market for 500 cars. The Florida Central & Peninsular has ordered 250 fruit cars from the Mt. Vernon Car Co. Hanover Construction Co. has ordered 50 flat cars from the Illinois Car & Equipment Co. An order will be placed soon by the W. & L. E. The 500 coal cars for the Lake Shore will be built by the Buffalo Car & Mfg. Co. The P. & L. E. has ordered 500 coal cars from the Michigan-Peninsular Car Co. The D. & I. R. Road has bought 300 ore cars from the Michigan-Peninsular Car Co. The Illinois Car & Equipment Co. will build 175 cars for the Minneapolis & St. Louis. The Cincinnati, New Orleans & Texas Pacific has placed an order with the Ohio Falls Car & Mfg. Co. for 500 cars. The Mobile & Ohio has added 400 cars to a recent order of 600, dividing the 400 between the Pullman and Mt. Vernon companies. The Southern Pacific has bought 100 cars from the Rodger Ballast Car Co.

The Foster Engineering Co., of Newark, N. J., has declared a dividend of 10 per cent out of the net earnings of 1897.

The Homestead Steel Works resumed in full Jan. 23, including the 35 and 40-inch mills, which have been closed for repairs. The 33-inch mill is being converted into a girder rail mill and is expected to make this week the first girder rails ever rolled in Homestead.

The Union Tube & Iron Co., Warren, O., at its meeting last week, organized as follows for 1898: President, Warner Arms, of Youngstown; vice-president, D. P. Wheeler, of Akron; secretary and treasurer, F. M. Peet, of Warren. The old board of directors was re-elected.

The riveters at the Wheeler Shipyards, Bay City, Mich., are out against a 7 per cent increase. They had been on a strike for the scale of 1895. It is stated that the company asked the men to sign an agreement not to act as a body, and to permit the retention of 10 per cent of their wages, to guarantee that they would not quit work without the company's consent.

A number of additions will be shown by the Feb. 1 report, to the list of active furnaces, in Pennsylvania. In the Lebanon Valley four or five more furnaces will be active; in the Lower Susquehanna district, two—one at Harrisburg and one in Lancaster county. In the Juniata valley the Marshal Furnace will probably resume and possibly one Bedford county stack.

The Eureka Cast Seel Co.'s plant in Chester, Pa., which has been in the hands of a receiver for a year, has been ordered sold by the sheriff.

The Union Steel Co., with works at Alexandria, Ind., now in the hands of a receiver, is being reorganized. The court will soon be asked to dismiss the receiver and restore the management of the plant to the company, which will be put in full operation and in addition will make large improvements.

The Montpelier (Ind.) Sheet & Tin Plate Co.'s plant has been idle most of January by the breaking of a main shaft, but is now ready to resume.

At the Michigan-Peninsular Rolling Mill, at Detroit, another of the large "camel-back" heating furnaces is being built. The mill is turning out over 10,000 lbs. per heat, either bar piles or faggots.

A Wheeling dispatch says that a notice has been given at the Benwood plant of the Wheeling Sheet & Iron Co., of a reduction in wages, to take effect Feb. 21.

Wm. B. Pollock & Co., of Youngstown, O., have a contract for furnace erection work for the Carnegie Steel Co., Ltd.

The Missouri Car & Foundry Co. will start up the wheel department at Madison, Ill., shortly, and later a gray iron and malleable iron department will be opened, for the making of a general line of castings for car and other classes of work.